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ABSTRACT

The contents of this document include the following papers, each followed by a discussion amongst workshop participants: "Nutritional Studies on United States Preschool Children: Dietary Intakes and Practices of Food Procurement, Preparation, and Consumption, "Kathryn M. Kram and George M. Owen; "Food and Nutrition Intake of Children from Birth to Four Years of Age," Juanita A. Eagles and Priscilla D. Steele; "Child Feeding in the Rural Low-Income Family, "Jana W. Jones; "Infant and Child Feeding Practices in the Urban Community in the North-central Region," Norge W. Jerome, Barbara B. Kiser and Estella A. West; "Poor People, Good Food, and Fat Babies: Observations on Dietary Behavior and Nutrition Among Low-income, Urban Afro-American Infants and Children," Betty Lou Valentine and Charles A. Valentine; "Cultural Determinants of Food Habits in Children of Mexican Descent in California," Phyllis B. Acosta and Robert G. Aranda; "Infant and Childhood Feeding Practices Among Low-Income Families in Urban Hawaii," Myrtle L. Brown and Claire Hughes Ho; and, "Infant and Child Feeding Practices Among Low-Income Reservation and Rural American Indian and Alaska Native Families," Mary A. Peterson. (JM)

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Practices of low-income families in feeding infants and small children

with particular attention to cultural subgroups

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Proceedings of a
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Airlie Conference Center
Warrenton, Virginia
March 17–18, 1971

Samuel J. Fomon, M.D., and
Thomas A. Anderson, Ph. D., Editors

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Introductory remarks

Dr. Thomas A. Anderson, Session Chairman: I should like to review the events that have led to this meeting.

One of the specific recommendations of the 1969 White House Conference on Food, Nutrition, and Health [1] was expressed as follows:

> *Recommendation No. 8.* Need for compilation and dissemination of information regarding nutritionally sound feeding practices.
>
> A task force should be assembled to record what is already known and to define specific areas in which additional information is needed regarding feeding practices of infants, toddlers, school-age children and teenagers among various cultural groups. People with firsthand information regarding such practices should be included. From this information reference materials should be developed for advising parents regarding choice and preparation of foods including milk and formula. Every effort should be made to complete these reference materials by the end of 1970.
>
> The task force should classify (as to calorie and individual essential nutrients) commercially available foods and, particularly, foods used in specific cultural groups and determine the types of information to be included in a data bank, which can then serve as a ready reference source for health workers.

In the followup of the White House Conference, the Maternal and Child Health Service of the Health Services and Mental Health Administration, DHEW, provided funds to hold a workshop devoted to the topic of feeding practices among various cultural groups, especially those of low income. Rather than attempting to cover the entire childhood age span from birth through adolescence, it was decided to focus on practices pertaining to children during the first 3 years of life. This decision did not imply that other age groups were less important. Rather, it was believed that by limiting the age range to be considered, the topic could be examined in greater depth.

Although information on practices of low-income groups in feeding infants and preschool children has appeared in the literature, the reports are not always easy to locate. In addition, nutritionists, social workers, anthropologists, public health nurses, and many other workers carry in their heads a wealth of information about feeding practices. We hope that the published report of this meeting—the formal presentations and abstracted discussions—will provide a convenient source of information.

We do not anticipate that the report of this workshop will present a completely balanced and comprehensive view of the subject. Feeding practices of low-income rural families in Montana and Appalachia will not necessarily be similar to practices of low-income families in other rural areas; feeding practices among Mexican-Americans in California and Arizona may differ widely from those of Mexican-Americans in Texas. We shall be focusing on examples. However, with the diversity of experiences represented by the participants, we hope to be able to record something of the range of feeding practices among low-income groups and perhaps to make some generalizations.

[1] White House Conference on Food, Nutrition and Health. Final Report. Washington, D.C., U.S. Government Printing Office, 1970, p. 50.

Survey information

Nutritional studies on United States preschool children: dietary intakes and practices of food procurement, preparation and consumption

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INTRODUCTION

Between November 1968 and December 1970, we undertook a study which had as its primary objective the description of nutritional status of preschool-age children in the United States [1]. The population group aged 12 to 71 months was chosen because little information was available concerning this age group and, as judged by observations in developing countries, this is clearly the age interval when the greatest rewards of preventive medicine can be realized. There is also considerable sociological evidence that the effects of social, economic and educational disadvantage are already manifest by the age of 3 years and that if intervention is to be successful, it must be initiated prior to this time.

Assessment of nutritional status was made by the collection of 2-day diet records by a trained interviewer in the home, past medical history of the subject and pertinent information on the mother's prenatal history, anthropometric measurements which included height, weight, and thoracic skin fold thickness, detailed physical examination by a pediatrician, hand-wrist X-ray, dental examination by a dentist, and extensive laboratory studies. These measurements were made on each selected subject who cooperated with the full survey protocol.

The investigators believed that the collection of scientific measurements on nutritional status per se would be meaningless without some indications of why children eat the foods they eat. For this reason, information was sought concerning family socioeconomic factors, family and child eating practices, methods of obtaining foods, amount of money spent on food and related items. In addition, the sociologist on the team included information of a descriptive nature on community and recreational activities of families with young children.

This report will present a brief statement of the survey sample, personnel and methodology used. Results will be presented on only the first half sample (November 1968 to December 1969) of the total study population. Demographic characteristics and data on food procurement and preparation will be presented as family data. Information on nutrient intakes and on infant and child feeding practices will be given only for children 12–47 months, with references to practices of older children where indicated.

SAMPLE

A national sample of dwellings had been designed by the Survey Research Center, The University of Michigan, to represent households in conterminous United States exclusive of those on military reservations (*1*). The 74 sample points, currently located in 36 states and the District of Columbia, included 12 major metropolitan areas, 32 other Standard Metropolitan Statistical Areas

[1] Study supported by Maternal and Child Health Service, HSMHA, HEW, Research Grant H-170.

(SMSA's) and 30 counties or county groups representing the nonmetropolitan or rural portions of the country. In the multistage sample, first-stage stratification was carried out independently within each of four major geographical regions—northeast, north-central, south, and west—each of which received representation in proportion to its population. Criteria for the formation of strata included SMSA classification, size of the largest city, rate of population growth, major industry or major type of farming, and in the South, the proportion of nonwhite population.

To balance the 2 yearly samples, one-half of each of the six largest metropolitan areas was scheduled for interviewing in each year. Division of the remaining 68 primary areas into halves was controlled in such a manner that each year's interviews comprised a national cross-sectional sample of preschool children. Since data from the second half sample are still being compiled, this report includes data from the first year only.

METHODS

Basic information concerning the composition of each family with preschool children included in the study was obtained by one of the 15 trained dietary interviewers (home economists and dietitians on our staff) who visited in the homes. The number of adults and children in the family unit was recorded. No more than three preschool children (1–6 years old) per selected family were included in the study. Occupational and educational attainment of heads of households were listed and estimates were made of total family income, including money-in-kind. The interviewer collected information on type of dwelling and recorded information about family mobility.

Dietary data were collected by the dietary interviewers during 3-day home interviews. The dietary interview schedules included information on family and child food habits and customs, sources of food, and amount of money spent on food. A 2-day record of food intake, including recipes of all home-prepared foods, was collected for each eligible preschool child in the family. Using a coding manual adapted from one developed by the U.S. Department of Agriculture (*2*), each interviewer coded the records she obtained. The majority of food and nutrient values were taken from Agriculture Handbook No. 8 (*3*) although other compositional tables were used (*4–10*) as well as information from major food companies for commercial products. At the conclusion of the 2-day diet record, the interviewer asked each respondent whether the child was currently receiving a vitamin and/or mineral supplement. The brand name, amount, and frequency of consumption were recorded, and standard codes were assigned for various kinds of supplements. Calculation of the nutritive values of diets and of vitamin/mineral supplements was performed by computer at the Columbus Laboratory of Battelle Memorial Institute. The interviewer also made appointments for the children to be seen later in the week for a physical examination. Most children were examined near the end of the same week the home interviews had been conducted.

At the time of the clinic examination, the medical history of the preschool child and the mother's obstetrical history, including age at first and last pregnancy and total number of pregnancies, were reviewed. Questions were asked about prenatal and perinatal events pertaining to the preschool child under study. The child's birth weight, place of birth, and a statement of condition at time of birth were recorded. Information was obtained concerning his immunizations, illnesses, accidents, and hospitalizations.

Each child's standing height and weight, head circumference, and thoracic fat-fold thickness were measured. An X-ray was taken of the handwrist to assess skeletal maturation and to detect evidence of metabolic disorders. A general physical examination was completed by a pediatrician, and about half the children had dental examinations performed by one pedodontist. Virtually all medical histories, anthropometric data, and X-rays were taken by five nurses. Altogether, some 25 pediatricians, the majority being residents at Columbus Children's Hospital, performed physical examinations.

Blood (approximately 5 ml.) was obtained by venipuncture, and hemoglobin and hematocrit determinations were completed in the field laboratory. Erythrocytes and plasma were separated, processed for freezing and shipped to the Nutrition-Renal Laboratory in Columbus for determination of iron, iron-binding capacity, total protein, albumin, vitamin A, vitamin C, urea nitrogen, cholesterol, and triglyceride content of plasma. Plasma proteins were also determined

electrophoretically and assays for pseudocholinesterase activity were completed on the majority of plasma specimens. Hemoglobin electrophoresis was performed on selected samples of erythrocytes.

Urine specimens voided in the clinic were tested there for glucose and protein. Specimens were then acidified, frozen and shipped to Columbus for determinations of creatinine, iodine, urea nitrogen, thiamin, and riboflavin content.

All information collected in the field by demographers, interviewers, and clinic teams was sent to Columbus. X-rays were developed in Columbus and sent to the Center for Human Development, University of Michigan, for interpretation by Drs. Stanley Garn and Roberto Frisancho.

RESULTS AND COMMENTS

Socioeconomic Characteristics

A sample of children which represents a cross-section of the total United States population could be subdivided in a variety of ways, the object of any subdivision being the reduction of variance within the group. For the purpose of simplicity and in light of the challenge of this workshop, we have chosen to divide the population into four groups of relatively equal size based on per capita income for the family unit.

Table 1 presents income data for families included in the first half sample of the Preschool Nutrition Survey. These four income quartiles will be used throughout the remainder of this report where income differences in values or responses were present. A summary of pertinent demographic characteristics is presented in table 2.

Dietary Intakes

Frequency distributions of intakes of total calories, calories/kg., total protein, protein/kg., calcium, iron, vitamin A, thiamin, riboflavin, and vitamin C from diet plus vitamin and/or mineral supplements are presented in tables 3–12. The population is divided into 1-year age intervals in each income quartile. Since the focus of this workshop is the infant and young child, intakes of children from 12 through 47 months only are presented.

In general, intakes of calories and nutrients, with the exception of iron and to some extent vitamin A, tended to increase with age and with income quartile. Intakes of calcium and vitamin C seemed particularly related to income group. Protein intakes were frequently two times as great as the Recommended Daily Dietary Allowances (RDA), and less than 5 percent of children had levels below the allowance (*11*). However, more than 90 percent of children under 3 years of age failed to meet the RDA for iron.

At each age interval, the percentage of children using supplements tended to increase as income increased (table 13). Within each income quartile, the proportion of children receiving supplements tended to be greatest in the 12–23-month age group. The majority of children taking supplements were using multivitamin preparations which did not contain iron.

The percent improvement from the contribution of vitamin supplement to the nutrient levels of vitamin A, thiamin, riboflavin, and vitamin C is presented in table 14.

Infant Feeding Practices

While the focus of the overall nutritional status study was the preschool child, some information on infant feeding practices and prenatal and perinatal events was collected by the nurse at the time of the clinic examination. Table 15 presents information on percentages of children breast-fed and bottle-fed at 1 week and at 2 months of age. No particular income trends were apparent.

When asked, "Did your child receive supplementary vitamins or iron at any time between 3 and 6 months of age?", most mothers replied that the child did (table 16); more than 75 percent said they had taken a nutritional supplement during pregnancy with this child. Because of the historical nature of the questions, respondents were not asked to quantify this information nor to indicate whether supplements were taken regularly.

Child Eating Practices

To illustrate changes in eating patterns in the age range under consideration, data are presented on children in the age groups 12–23 months and 24–47 months. Whenever differences between patterns of children or their parents in each of the four income quartiles seemed important, these differences are also presented.

Concern has been expressed that sizable numbers of children come to school without breakfast (*12*–

14). As illustrated in table 17, relatively few preschoolers in our study reportedly had nothing to eat in the morning. This impression was confirmed by the daily diet record obtained (to be reported elsewhere). With increasing age, more children prepared their own breakfasts some of the time.

Although there were few differences between children's reactions to new foods based on family income, there were differences between children by age (table 18). The question was geared to assess initial response to a new fruit or vegetable. In the 12–23-month-old age group, 82 percent of children would voluntarily try a new fruit or vegetable (combination of "tastes and rejects" and "tastes and usually eats"), and 68 percent would eat the food after tasting it. However, only 66 percent of 24–47-month-old children would willingly try the new food, and 58 percent would eat it. This pattern persisted among 48–71-month-old children (not reported here) and may be interpreted as an expression of emerging childhood identity or a growing aversion to fruits and vegetables.

One of our primary objectives in obtaining information on family and child eating practices was to investigate parental permissiveness in regard to young children's eating habits. As indicated in table 19, there seemed to be an increasing tendency among all income groups for mothers to set controls over meal and snack times for older children. Families in the upper income quartiles reportedly set controls twice as often as did those in the lowest income group. The manner in which parents rewarded or disciplined their preschoolers varied by age of child and by income level (tables 20–22). As indicated in table 20, there seemed to be an increasing tendency for parents at all income levels to use food to reward or punish older children. Tables 21 and 22 indicate that just as rational discipline was more frequently used by upper income families in response to misbehavior, so also was verbal praise more frequently used by these families in response to good behavior. Low-income families tended to use physical discipline or a physical and tangible reward more frequently.

When asked the question, "if child (insert name) does not like what you fix for the rest of the family, do you fix him something different?," mothers in the lowest income quartile replied that their children seldom asked for "different" foods. Between 12 and 23 months, children in the poorest families did not eat as much baby and junior food as those in higher income families (table 23). In upper income quartiles there seemed to be less tendency for mothers to cater to their children's food preferences as age increased.

There were fewer differences between the reactions of parents of different income groups to poor child eating behavior than might be expected. Table 24 presents these responses by age group and income level. It was again apparent that parents were more strict with older children than with younger ones. The mother was the more dominant figure for 12–23-month-old children while the father assumed a greater share of discipline for older children.

Characteristics of children in the first half sample attending child care programs are presented in table 25. A total of 21 children (2 percent of 12–47-month-old children) were enrolled in some type of child care program. There were proportionately more upper income children attending nursery school or day care programs.

Food Procurement and Preparation

In the 1940's, the late Kurt Lewin proposed the "Channel theory" to explain how food gets to the table and why. He postulated that within each family there was a "gatekeeper" who determined how food entered each channel. The attitudes and behavior of this person plus the forces governing his or her decision at each stage of food procurement determined the kind and amount of food available for consumption (*15*).

Tables 26 through 28 present data relevant to this theme; i.e., who buys food for the family, who prepares food, and who feeds or serves food to the preschool child. In each case, data are presented for the family members responsible for this task most of the time and some of the time. If one person was responsible for a given function all of the time, the data were not repeated in the second entry. In tables in which information is not broken down by age group, numbers and percentages refer to total families who responded to a given question.

From these tables it is apparent that the mothers studied assumed major responsibility for food procurement, preparation and child care. However, in the low-income family someone other than the mother assumed a greater share of responsibility for these household tasks than in more well-to-do families.

We might postulate that one reason for this occurrence was the increased incidence of fatherless

families among this group (table 29) and the greater number of persons per family among poor families (table 30), which place greater burdens on the female head. However, greater numbers of mothers in families having moderate or high incomes were employed in gainful occupations. The percentage figures for employment of mothers was: 21 percent, quartile I; 20 percent, quartile II; 31 percent, quartile III; and 28 percent, quartile IV. Mothers in upper-income quartiles were reportedly also away from home more hours per week than mothers in the lowest income quartile (table 31).

The attitude of the mother or other person responsible for meal planning and preparation toward food and use of new foods may also affect the diet of the child. Does the person who is responsible for meal preparation consider her job a chore, or does she enjoy cooking? Table 32 indicates that more respondents in upper income quartiles replied they enjoyed cooking. Similarly, more respondents in these quartiles indicated they tried new foods or new ways of fixing foods and used printed recipes more frequently.

There were also differences between families of differing income levels in regard to the manner in which the person responsible for food preparation obtained information about food. As presented in table 33, fewer low-income families used professional or public service channels, such as clinics or government publications, as their primary source of information. It is not surprising that a neighbor or relative was more frequently mentioned as a source of information among low-income families; however, none of the differences between income groups was really striking.

Table 34 presents data on the kind of store used by families of different income levels for their major grocery shopping and the reasons given for shopping at small grocery stores, supermarkets, or discount markets. Although supermarkets were mentioned most frequently by all families, it is interesting to note that 19 percent of low-income families shopped at small grocery stores and that 26 percent of those who used the small grocery store did so because they felt food prices were lower.

Characteristics of Low-Income Families

In preceding sections of this paper, we included data on families and children of all income levels and would now like to confine our discussion to low-income families. Children in the lowest income quartile were divided into two groups: Children having low dietary intakes of calories, protein, calcium, vitamin A, or vitamin C and those having adequate intakes of calories and these nutrients from all sources, i.e., diet plus vitamin/mineral supplements.

Basic demographic characteristics for children in each group are shown in table 35. It is readily apparent that children who had low intakes were more likely to live in poor housing, their fathers had occupations with less social prestige, and public or private welfare (rank 6 or 7) more frequently provided the source of income. The mothers of these children had less education than did mothers of better fed children.

In some respects, it should not be surprising that attitudes toward food preparation and recipes (table 36) were more negative among mothers or mother figures of children having low intakes. Although the numbers are admittedly small, the differences between practices exhibited by these mothers are consistent.

CONCLUSION

In a pilot study conducted in Mississippi between November 1967 and March 1968, low-income preschool children were found to be at greater risk nutritionally than were more affluent youngsters in the population (*16*, *17*). Information from the first half sample of the national study seems to confirm these observations. Growth achievement (*18*) and biochemical findings (*19–21*) lend support to the dietary data presented here and indicate that poverty children are smaller than average and appear to have biochemical levels more indicative of suboptimal nutrition.

Table 1.—Income data for families of children (12–47 months) in first half sample [1] of the Preschool Nutrition Survey

Income quartile	Families (Number)	Children (Number)	Range [2]	Median
I	239	239	$0–$900	$590
II	241	208	901–1,300	1,12
III	327	271	1,301–1,900	1,625
IV	361	286	1,901–6,700	2,560

[1] Cross-sectional sample of U.S. population.
[2] Based on total take-home pay for family unit divided by number of individuals in the family unit.

Table 2.—Demographic characteristics of families in first half sample, Preschool Nutrition Survey

Income quartile	I	II	III	IV
Total number of families	239	241	321	361
Race:				
White	[1] 48	83	88	94
Black	45	10	7	4
Brown	6	6	4	1
Other	1	1	1	1
Location:				
Urban	52	57	57	66
Rural nonfarm	35	37	38	30
Rural farm	13	6	5	4
Dwelling type:				
Above average or excellent	0	7	15	27
Average or below average	46	78	73	69
Poor or very poor	54	15	12	4
Provision of housing:				
Family owns	32	63	64	67
Private rental	43	30	35	32
Public housing project	5	2	1	0
Employer owns	12	3	0	1
Someone else provides	9	3	0	0
Possessions (percent for each item):				
Indoor toilet	76	97	99	100
Telephone	48	81	86	93
Automobile	57	91	93	97
Television	91	97	99	99
Maternal education:				
0–6 years	6	5	2	0
7–9 years	33	13	8	2
10–11 years	25	19	14	8
12 years	32	50	57	52
13 years or more	3	12	19	38
Living children:				
One	9	8	14	30
Two	19	15	35	36
Three	19	25	24	23
Four–six	32	45	36	9
Seven or more	21	8	2	3
Federal food program:				
Receive food stamps or commodities	55	5	1	0

[1] Percentages of income group in vertical columns for each characteristic.

Table 3.—Frequency distribution of total calories (kcal.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 200	200 to 399	400 to 599	600 to 799	800 to 999	1,000 to 1,199	1,200 to 1,399	1,400 to 1,599	1,600 to 1,799	1,800 to 1,999	2,000 to 2,199	2,200 and above	Mean	(SD[1])	Median
I	12–23	(66)	[2] 0	0	3	8	22	28	19	11	2	6	2	0	1,157	(338)	1,117
	24–35	(87)	0	0	4	6	18	19	24	9	8	5	6	2	1,289	(440)	1,218
	36–47	(86)	0	0	1	7	7	21	20	19	10	7	3	5	1,383	(416)	1,346
II	12–23	(65)	0	0	5	20	29	21	12	6	5	3	0	0	1,042	(325)	982
	24–35	(60)	0	0	0	3	13	23	23	15	12	7	2	2	1,336	(353)	1,270
	36–47	(83)	0	0	0	1	5	14	20	20	17	11	6	5	1,523	(378)	1,469
III	12–23	(74)	0	0	3	18	19	30	12	4	8	0	4	3	1,139	(418)	1,066
	24–35	(100)	0	0	0	4	10	17	19	23	12	6	8	1	1,406	(367)	1,405
	36–47	(97)	0	1	0	4	5	11	24	24	16	4	4	6	1,483	(513)	1,425
IV	12–23	(89)	0	0	2	7	22	25	20	8	6	4	4	1	1,224	(377)	1,163
	24–35	(93)	0	0	0	4	9	18	28	16	11	12	1	1	1,369	(333)	1,364
	36–47	(104)	0	0	0	1	5	12	30	22	11	10	6	5	1,503	(390)	1,461
Total	12–23	(294)	0	0	3	13	23	26	16	7	5	3	3	1			
	24–35	(340)	0	0	1	4	12	19	23	16	11	7	4	1			
	36–47	(370)	0	0	0	3	5	14	24	21	14	8	5	5			

[1] Standard deviation.
[2] Percentage of each age and income group in horizontal line.

Table 4.—Frequency distribution of calories per kilogram (kcal./kg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 50	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to 149	150 and above	Mean	(SD)	Median
I	12–23	(43)	[1] 0	5	2	9	21	7	28	2	5	9	5	7	103	(29)	102
	24–35	(57)	2	4	11	9	16	16	7	19	2	5	0	11	101	(37)	94
	36–47	(64)	5	6	6	16	13	17	11	11	3	5	2	6	94	(31)	94
II	12–23	(48)	2	2	10	19	13	13	10	10	4	4	6	6	96	(27)	91
	24–35	(46)	0	0	7	9	17	22	7	11	9	2	4	13	107	(32)	99
	36–47	(65)	0	0	5	15	14	17	14	12	12	5	3	3	101	(24)	98
III	12–23	(54)	4	2	11	7	15	7	11	15	13	6	2	7	104	(37)	103
	24–35	(78)	0	3	9	5	9	17	17	10	10	6	8	6	107	(30)	106
	36–47	(74)	3	4	3	9	23	16	11	12	7	3	7	3	99	(32)	95
IV	12–23	(62)	2	0	5	10	16	13	13	8	6	11	5	11	111	(38)	108
	24–35	(67)	1	1	10	4	15	10	22	6	13	3	6	6	103	(27)	103
	36–47	(83)	0	1	4	12	16	22	14	12	6	6	2	5	102	(28)	97
Total	12–23	(207)	2	2	7	11	16	10	15	9	7	8	4	8			
	24–35	(248)	1	2	9	6	14	16	14	11	9	4	5	8			
	36–47	(286)	2	3	4	13	16	18	13	12	7	5	3	4			

[1] Percentage of each age and income group in horizontal line.

Table 5.—Frequency distribution of total protein (gm.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 10	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 and above	Mean	(SD)	Median
I	12–23	(66)	[1] 0	2	9	28	27	14	11	6	3	0	0	0	47	(16)	45
	24–35	(87)	0	2	8	16	31	16	13	7	4	1	1	0	50	(17)	46
	36–47	(86)	0	3	2	15	24	23	14	9	5	1	1	1	54	(19)	52
II	12–23	(65)	0	2	17	38	17	12	11	3	2	0	0	0	42	(14)	38
	24–35	(60)	0	0	5	20	23	23	17	3	5	3	0	0	51	(16)	50
	36–47	(83)	0	0	2	16	18	24	17	11	8	1	2	0	57	(18)	57
III	12–23	(74)	0	0	15	30	24	12	9	5	0	3	0	1	46	(18)	43
	24–35	(100)	0	0	7	15	23	28	11	11	4	1	0	0	52	(15)	52
	36–47	(97)	0	1	2	15	16	30	16	8	3	2	3	2	58	(22)	57
IV	12–23	(89)	0	2	6	19	28	26	9	3	6	1	0	0	50	(16)	48
	24–35	(93)	0	2	3	17	19	26	18	11	2	0	1	0	53	(15)	54
	36–47	(104)	0	0	2	10	33	22	14	11	7	2	0	0	56	(15)	53
Total	12–23	(294)	0	1	11	28	24	17	10	4	3	1	0	0			
	24–35	(340)	0	1	6	17	24	24	14	9	4	1	1	0			
	36–47	(370)	0	1	2	14	23	25	15	10	6	2	0	1			

[1] Percentage of each age and income group in horizontal line.

Table 6.—Frequency distribution of protein per kilogram (gm./kg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 1.0	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 to 2.9	3.0 to 3.4	3.5 to 3.9	4.0 to 4.4	4.5 to 4.9	5.0 to 5.4	5.5 to 5.9	6.0 and above	Mean	(SD)	Median
I	12–23	(43)	[1] 0	0	0	7	9	21	14	9	9	7	9	14	4.2	(1.5)	3.8
	24–35	(57)	0	4	2	11	11	12	12	23	11	2	2	2	3.9	(1.5)	3.9
	36–47	(64)	0	5	2	13	9	17	20	13	8	5	3	6	3.7	(1.5)	3.5
II	12–23	(48)	0	0	4	6	17	15	23	8	4	10	8	4	3.8	(1.2)	3.9
	24–35	(46)	0	0	2	9	7	20	7	22	11	9	2	13	4.1	(1.4)	4.2
	36–47	(65)	0	0	0	8	22	12	18	14	9	5	5	8	3.8	(1.1)	3.7
III	12–23	(54)	0	0	0	11	15	11	9	17	9	11	4	13	4.2	(1.6)	4.1
	24–35	(78)	0	0	1	8	14	10	14	21	14	4	8	6	3.9	(1.2)	4.0
	36–47	(74)	0	0	3	11	9	16	20	14	12	5	1	8	3.8	(1.4)	3.7
IV	12–23	(62)	0	0	2	5	5	6	18	13	23	8	8	13	4.5	(1.5)	4.6
	24–35	(67)	0	1	1	4	7	24	10	25	10	4	6	4	3.9	(1.2)	4.0
	36–47	(83)	0	0	1	4	16	25	17	7	20	4	4	2	3.7	(1.0)	3.5
Total	12–23	(207)	0	0	1	7	11	13	16	12	12	9	7	11			
	24–35	(248)	0	1	2	8	10	16	11	23	12	4	5	8			
	36–47	(286)	0	1	1	8	14	18	19	12	13	5	3	6			

[1] Percentage of each age and income group in horizontal line.

Table 7.—Frequency distribution of calcium (mg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 200	200 to 299	300 to 399	400 to 499	500 to 599	600 to 699	700 to 799	800 to 899	900 to 999	1,000 to 1,199	1,200 to 1,499	1,500 and above	Mean	(SD)	Median
--	12–23	(66)	[1] 6	5	8	6	15	5	15	9	3	15	9	5	783	(417)	745
	24–35	(87)	9	5	15	10	14	10	9	8	3	13	2	1	625	(321)	546
	36–47	(86)	5	9	7	12	16	12	9	8	8	10	2	1	654	(321)	614
II	12–23	(65)	2	2	6	9	20	9	9	9	12	14	6	2	751	(302)	728
	24–35	(60)	0	3	12	3	10	22	5	15	10	8	8	3	785	(346)	718
	36–47	(83)	0	4	12	4	10	6	18	10	8	12	8	8	837	(385)	766
III	12–23	(74)	0	0	3	11	11	9	11	11	8	14	15	8	934	(451)	862
	24–35	(100)	0	4	6	3	12	9	14	14	13	17	7	1	810	(290)	809
	36–47	(97)	2	1	4	9	7	8	12	15	14	10	8	7	854	(355)	818
IV	12–23	(89)	0	0	6	3	10	10	13	10	13	13	11	9	921	(375)	885
	24–35	(93)	2	3	6	6	10	14	8	12	8	17	10	4	823	(363)	806
	36–47	(104)	0	2	2	2	13	13	23	11	9	15	7	3	833	(289)	776
Total	12–23	(294)	2	1	5	7	14	9	12	10	10	14	11	6			
	24–35	(340)	3	4	9	6	11	13	9	12	9	14	7	2			
	36–47	(370)	2	4	6	6	12	10	16	11	10	12	6	5			

[1] Percentage of each age and income group in horizontal line.

Table 8.—Frequency distribution of iron [1] (mg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 2	2 to 3	4 to 5	6 to 7	8 to 9	10 to 11	12 to 13	14 to 15	16 to 18	19 to 21	22 to 24	25 and above	Mean	(SD)	Median
I	12-23	(66)	[2] 0	11	23	33	11	3	0	3	3	9	3	2	8	(7)	7
	24-35	(87)	0	3	28	22	21	8	6	1	5	2	2	2	9	(7)	7
	36-47	(86)	0	5	10	33	26	9	6	2	1	6	1	1	8	(5)	8
II	12-23	(65)	0	34	18	18	6	5	3	3	3	6	3	0	7	(6)	5
	24-35	(60)	0	3	37	23	20	5	2	0	7	2	0	2	7	(5)	6
	36-47	(83)	0	1	16	27	19	22	1	1	1	10	1	1	9	(5)	8
III	12-23	(74)	0	18	32	19	8	4	4	4	5	0	1	4	7	(7)	6
	24-35	(100)	0	5	21	21	27	12	2	0	4	5	2	1	8	(5)	8
	36-47	(97)	0	2	22	26	22	7	3	2	6	4	3	3	9	(6)	8
IV	12-23	(89)	1	9	28	21	18	9	3	2	4	2	1	0	7	(4)	7
	24-35	(93)	0	6	16	31	15	12	3	3	8	2	0	3	8	(6)	7
	36-47	(104)	0	1	15	32	20	12	5	1	5	5	5	0	9	(5)	8
Total	12-23	(294)	0	17	26	23	11	5	3	3	4	4	2	1			
	24-35	(340)	0	5	24	24	21	10	3	1	6	3	1	2			
	36-47	(370)	0	2	16	29	22	12	4	2	4	6	3	1			

[1] Intakes from all sources.
[2] Percentage of each age and income group in horizontal line.

Table 9.—Frequency distribution of vitamin A[1] (IU) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 500	500 to 999	1,000 to 1,499	1,500 to 1,999	2,000 to 2,499	2,500 to 2,999	3,000 to 3,499	3,500 to 3,999	4,000 to 5,999	6,000 to 7,999	8,000 to 10,999	11,000 and above	Mean	(SD)	Median
I	12-23	(66)	[2] 5	3	3	8	9	9	6	8	29	14	2	5	4,570	(3,980)	3,970
	24-35	(87)	2	5	14	13	6	7	5	11	24	6	6	3	3,800	(2,750)	3,530
	36-47	(86)	5	8	5	10	9	8	10	6	23	8	3	5	4,100	(4,040)	3,220
II	12-23	(65)	0	2	5	9	12	14	5	5	27	17	6	0	4,180	(2,150)	4,070
	24-35	(60)	8	3	7	10	8	8	8	3	33	7	5	7	5,130	(6,540)	4,160
	36-47	(83)	0	1	7	8	7	4	4	4	36	17	8	4	5,060	(3,290)	4,740
III	12-23	(74)	0	3	5	3	7	9	5	4	42	8	5	8	5,180	(3,360)	4,820
	24-35	(100)	0	1	6	7	6	8	5	6	32	15	10	4	5,340	(4,800)	4,810
	36-47	(97)	0	2	4	12	10	5	1	6	37	16	3	2	4,620	(3,230)	4,490
IV	12-23	(89)	0	1	4	3	7	6	6	2	37	12	12	9	5,690	(3,390)	5,190
	24-35	(93)	1	2	5	3	6	6	4	3	35	16	10	6	5,320	(3,030)	5,080
	36-47	(104)	0	1	5	7	4	6	8	4	35	19	7	6	5,330	(3,110)	5,090
Total	12-23	(294)	1	2	4	5	9	9	5	4	34	13	7	6			
	24-35	(340)	1	3	8	8	6	7	5	6	31	11	8	5			
	36-47	(370)	1	3	5	9	8	6	6	5	33	15	5	4			

[1] Intake from all sources.
[2] Percentage of each age and income group in horizontal line.

Table 10.—Frequency distribution of thiamin[1](mg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than .10	.10 to .19	.20 to .29	.30 to .39	.40 to .49	.50 to .59	.60 to .69	.70 to .79	.80 to .89	.90 to .99	1.00 to 1.99	2.00 and above	Mean	(SD)	Median
I	12–23	(66)	[2] 0	0	3	6	11	9	8	9	6	8	31	9	1.01	(0.59)	0.83
	24–35	(87)	0	1	2	1	13	11	9	10	8	3	34	7	1.03	(.59)	.81
	36–47	(86)	0	1	0	5	6	13	14	10	7	5	31	9	1.05	(.61)	.81
II	12–23	(65)	0	0	0	11	15	15	5	8	0	5	30	12	1.07	(.65)	.76
	24–35	(60)	0	0	3	3	5	12	12	8	5	3	35	13	1.17	(.67)	.93
	36–47	(83)	0	0	1	2	5	12	5	7	5	5	37	20	1.30	(.68)	1.14
III	12–23	(74)	0	0	1	5	9	12	1	5	7	7	41	11	1.24	(.70)	1.09
	24–35	(100)	0	0	1	3	5	4	3	10	9	8	36	21	1.37	(.69)	1.32
	36–47	(97)	0	1	1	3	3	7	5	9	6	5	31	28	1.43	(.78)	1.41
IV	12–23	(89)		0	2	4	8	9	9	2	4	3	45	12	1.29	(.69)	1.41
	24–35	(93)	0	0	0	1	4	8	9	13	4	3	38	20	1.42	(.72)	1.69
	36–47	(104)	0	0	0	0	4	9	6	9	11	3	38	22	1.46	(.74)	1.68
Total	12–23	(294)	0	0	2	6	11	11	6	6	4	5	37	11			
	24–35	(340)	0	0	1	2	7	8	8	11	7	5	36	16			
	36–47	(370)	0	1	1	2	4	10	7	9	7	4	34	20			

[1] Intake from all sources.
[2] Percentage of each age and income group in horizontal line.

Table 11.—Frequency distribution of riboflavin [1] (mg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than .20	.20 to .49	.50 to .79	0.80 to 1.09	1.10 to 1.39	1.40 to 1.69	1.70 to 1.99	2.00 to 2.29	2.30 to 2.59	2.60 to 2.89	2.90 to 3.19	3.20 and above	Mean	(SD)	Median
I	12–23	(66)	[2] 0	3	8	15	17	12	6	8	8	8	6	9	1.78	(0.90)	1.54
	24–35	(87)	0	5	15	16	19	9	9	3	11	2	5	6	1.55	(.87)	1.27
	36–47	(86)	1	6	8	16	20	15	7	5	7	5	6	6	1.57	(.84)	1.38
II	12–23	(65)	0	0	9	11	21	14	2	6	11	9	11	8	1.87	(.90)	1.56
	24–35	(60)	0	3	5	10	18	5	8	13	0	13	12	12	2.08	(1.25)	2.02
	36–47	(83)	0	0	11	6	14	8	5	11	8	17	6	13	2.08	(.92)	2.18
III	12–23	(74)	0	0	4	4	15	11	7	9	14	12	11	14	2.28	(1.05)	2.31
	24–35	(100)	0	1	5	9	8	13	10	6	10	10	14	14	2.20	(.96)	2.29
	36–47	(97)	0	2	3	7	11	14	8	3	9	8	14	19	2.26	(1.05)	2.30
IV	12–23	(89)	0	0	7	7	11	8	8	7	7	11	11	24	2.37	(1.08)	2.42
	24–35	(93)	0	1	6	10	11	10	6	4	5	14	12	20	2.27	(1.08)	2.44
	36–47	(104)	0	0	3	5	19	10	5	3	10	12	16	18	2.32	(1.01)	2.53
Total	12–23	(294)	0	1	7	9	16	11	6	7	10	10	10	14			
	24–35	(340)	0	2	8	11	13	10	9	6	7	10	11	13			
	36–47	(370)	0	2	6	8	16	12	6	5	9	10	11	14			

[1] Intake from all sources.
[2] Percentage of each age and income group in horizontal line.

Table 12.—Frequency distribution of vitamin C [1] (mg.) for children in first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Less than 15	15 to 29	30 to 44	45 to 59	60 to 74	75 to 89	90 to 104	105 to 119	120 to 134	135 to 154	155 to 179	180 and above	Mean	(SD)	Median
I	12–23	(66)	[2] 20	18	8	8	14	14	6	2	3	6	3	0	56	(45)	56
	24–35	(87)	11	29	9	9	14	10	7	1	1	1	6	1	55	(44)	49
	36–47	(86)	20	19	13	5	9	7	10	6	3	1	5	2	62	(56)	45
II	12–23	(65)	12	15	9	6	18	8	12	11	3	2	3	0	66	(41)	70
	24–35	(60)	3	20	7	13	8	13	10	7	5	5	7	2	76	(51)	70
	36–47	(83)	5	17	12	5	6	10	7	10	7	4	7	11	91	(66)	84
III	12–23	(74)	1	20	9	9	11	11	12	11	5	4	4	1	76	(51)	74
	24–35	(100)	3	6	8	10	16	11	11	8	6	6	3	12	98	(67)	84
	36–47	(97)	5	16	7	3	10	14	15	7	7	4	3	6	85	(59)	80
IV	12–23	(89)	6	8	11	9	6	12	16	11	8	7	4	2	84	(47)	85
	24–35	(93)	5	9	4	6	4	17	14	8	8	9	6	10	100	(58)	93
	36–47	(104)	7	7	5	5	5	17	11	8	11	12	7	8	102	(63)	95
Total	12–23	(294)	9	15	10	8	12	11	12	9	5	5	4	1			
	24–35	(340)	6	15	7	9	11	13	11	6	5	5	5	7			
	36–47	(370)	8	14	9	4	8	13	11	8	7	5	5	7			

[1] Intake from all sources.
[2] Percentage of each age and income group in horizontal line.

Table 13.—Proportion of children in first half sample of Preschool Nutrition Survey receiving vitamin/mineral supplements, by age and income quartile

Age and income quartile	Children	
	Total number	Percent supplemented
12–23 months:		
I	66	34
II	65	46
III	74	57
IV	89	65
24–35 months:		
I	87	34
II	60	44
III	100	59
IV	93	57
36–47 months:		
I	86	30
II	83	44
III	97	50
IV	104	59

Table 14.—Percent increase in nutrient levels with contribution of vitamin supplements to mean daily intakes, first half sample, Preschool Nutrition Survey

Income quartile	Age (mos.)	(Number)	Vitamin A	Thiamin	Riboflavin	Vitamin C
I	12–23	(22)	60	142	83	121
	24–35	(30)	67	104	75	84
	36–47	(26)	80	100	80	76
II	12–23	(30)	68	131	72	98
	24–35	(26)	64	128	85	81
	36–47	(37)	76	117	82	85
III	12–23	(42)	76	129	73	104
	24–35	(59)	73	125	86	80
	36–47	(48)	70	122	86	83
IV	12–23	(58)	70	129	67	84
	24–35	(53)	80	146	90	90
	36–47	(61)	84	143	92	72

Table 15.—Percentage of breast- and bottle-fed infants

Income quartile	(Number)	1st week of life			2 months of age		
		Bottle	Breast	Bottle and breast	Bottle	Breast	Bottle and breast
I	(169)	[1] 65	27	8	82	11	7
II	(167)	72	24	4	83	14	2
III	(210)	70	28	2	83	13	4
IV	(211)	71	28	1	84	15	1

[1] Percentage of income group in horizontal line for each characteristic.

Table 16.—Vitamin/mineral supplementation

Income quartile	(Number)	Mothers supplemented during pregnancy		Children between 3 and 6 months of age taking supplements	
		No	Yes	No	Yes
I	(168)	[1] 25	75	31	68
II	(165)	9	91	17	83
III	(208)	9	91	11	89
IV	(208)	7	93	12	88

[1] Percentage of income group in horizontal line for each characteristic.

Table 17.—Breakfast patterns

Income quartile	12–23 Months			24–47 Months			
	(Number)	None	Someone else prepares	(Number)	None	Child prepares	Someone else prepares
I	(68)	[1] 1	99	(172)	6	5	89
II	(63)	3	97	(150)	1	4	95
III	(78)	3	97	(200)	3	5	92
IV	(88)	1	98	(196)	3	5	93

[1] Percentage of income group in horizontal line for each age group.

Table 18.—Child's reaction to new fruit or vegetable

Age (mos.)	(Number)	Never offered	Refuses to try	Tastes and rejects	Tastes under protest	Tastes and usually eats	Varies
12–23	(294)	[1] <1	4	14	7	68	7
24–47	(710)	<1	13	8	14	58	7

[1] Percentage of age group in horizontal line.

Table 19.—Parental control over meal and snack times

Income quartile	(Number)	No controls	Set meals, free snacks	Set meals, controlled snacks	Set meal and snack times [1]
12–23 months					
I	(68)	[2] 38	29	26	6
II	(63)	10	27	60	3
III	(78)	17	24	56	3
IV	(88)	15	24	55	7
24–47 months					
I	(172)	30	27	38	5
II	(150)	14	22	57	7
III	(200)	10	27	62	1
IV	(194)	9	31	56	4

[1] Includes category "has set meal times and never lets child snack."
[2] Percentage of income group in horizontal line for each age group.

Table 20.—Parental use of food to reward or to punish

Income quartile	(Number)	Food used to punish		Food used to reward	
		No	Yes	No	Yes
12–23 months					
I	(68)	[1] 78	22	56	44
II	(63)	83	17	58	42
III	(78)	81	19	60	40
IV	(88)	94	6	77	23
24–47 months					
I	(171)	74	26	43	57
II	(150)	71	29	44	56
III	(200)	70	30	56	45
IV	(194)	77	23	57	43

[1] Percentage of income group in horizontal line for each age group and characteristic.

Table 21.—Parental discipline for mild misbehavior

Income quartile	(Number)	Never misbehaves [1]	Rational discipline	Physical discipline	Ignore or isolate	Restrict privilege
12–23 months						
I	(69)	[2] 26	43	25	4	1
II	(63)	11	54	25	8	2
III	(77)	18	52	19	9	1
IV	(88)	9	63	19	9	0
24–47 months						
I	(171)	11	43	30	15	1
II	(150)	5	56	21	15	3
III	(200)	5	63	17	14	2
IV	(190)	2	67	15	15	2

[1] Includes: "Redirect attention."
[2] Percentage of income group in horizontal line for each age group.

Table 22.—Parental response to good behavior

Income quartile	(Number)	Do nothing	Verbal response	Physical or tangible response
12–23 months				
I	(66)	[1] 27	17	56
II	(63)	27	18	55
III	(77)	31	21	48
IV	(87)	17	31	49
24–47 months				
I	(170)	18	19	63
II	(148)	11	36	53
III	(200)	15	38	47
IV	(194)	10	48	41

[1] Percentage of income group in horizontal line for each age group.

Table 23.—Mother caters to food preferences

Income quartile	(Number)	No	Yes [1]	Eats baby or junior foods	Never asks for different foods
12–23 months					
I	(68)	[2] 35	44	3	18
II	(63)	16	52	24	8
III	(78)	19	53	21	8
IV	(88)	32	48	9	11
24–47 months					
I	(170)	44	40	0	16
II	(150)	45	49	1	5
III	(199)	51	41	0	9
IV	(196)	43	48	1	8

[1] Includes "yes, always" and "always has something he likes."
[2] Percentage of income group in horizontal line for each age group.

Table 24.—Parental response [1] when child does not eat as parents believe he should

Income quartile	(Number)	Neither is strict	Both are equally strict	Mother is more strict	Father is more strict
		12–23 months			
I	(49)	[2] 14	16	41	29
II	(59)	15	10	44	31
III	(76)	11	12	50	28
IV	(87)	16	9	49	25
		24–47 months			
I	(126)	11	10	43	37
II	(142)	5	10	38	47
III	(192)	7	12	43	38
IV	(192)	9	12	39	41

[1] Question asked only if both father and mother figure lived in the home.
[2] Percentage of income group in horizontal line for each age group.

Table 25.—Characteristics of children attending child care programs, first half sample, Preschool Nutrition Survey

	Nursery school or day care	Head Start or prekindergarten
Total number	19	2
Mean age in months	35	43
Age distribution:		
12–23 months	1	0
24–35 months	7	0
36–47 months	11	2
Sex:		
Male	12	2
Female	7	0
Race:		
White	18	1
Black	1	1
Income quartile:		
I	2	0
II	1	1
III	7	1
IV	9	0
Region:		
Northeast	3	1
North-central	3	1
South	13	0
West	3	0

Table 26.—Person who shops for family

Income quartile	Most of the time					Some of the time						
	(Number)	Mother	Father	Mother figure	Someone else	(Number)	Mother	Father	Mother figure	Other relative >15 yrs.	Other relative <15 yrs.	Unrelated person
I	(239)	[1] 80	9	3	8	(98)	24	48	4	12	7	4
II	(240)	86	9	1	3	(85)	20	74	<1	5	0	0
III	(321)	90	8	2	1	(125)	15	81	1	2	0	1
IV	(361)	96	4	<1	<1	(118)	7	86	1	3	1	2

[1] Percentage of income group in horizontal line.

Table 27.—Person who cooks for family

Income quartile	Most of the time					Some of the time						
	(Number)	Mother	Father	Mother figure	Someone else	(Number)	Mother	Father	Mother figure	Other relative >15 yrs.	Other relative <15 yrs.	Unrelated person
I	(239)	[1] 87	<1	6	6	(106)	20	16	4	29	25	6
II	(240)	95	<1	2	3	(92)	10	38	1	30	20	1
III	(321)	96	0	2	2	(111)	9	51	1	20	14	5
IV	(361)	96	<1	1	2	(105)	11	59	2	11	6	10

[1] Percentage of income group in horizontal line.

Table 28.—Person who supervises mealtime

Income quartile	12–23 Months					24–47 Months				
	(Number)	Child	Mother	Father	Someone else	(Number)	Child	Mother	Father	Someone else
					Most of the time					
I	(67)	[1] 0	88	3	9	(172)	2	88	2	8
II	(62)	0	94	3	2	(149)	3	91	3	4
III	(76)	0	91	5	4	(199)	2	89	5	4
IV	(88)	0	92	3	5	(194)	1	91	6	3
					Some of the time					
I	(42)	2	5	24	69	(101)	1	13	30	56
II	(36)	6	8	61	25	(87)	5	11	47	37
III	(39)	3	15	67	15	(112)	4	12	67	18
IV	(57)	0	12	60	28	(119)	9	14	48	29

[1] Percentage of income group in horizontal line for each age group.

Table 29.—Characteristics of families of 88 children 12–47 months old having no father and no father figure, first half sample, Preschool Nutrition Survey [1]

	Number	Percent of group
Race:		
White	45	51
Black	40	45
Other	3	4
Income quartile:		
0–900	66	75
901–1,300	9	10
1,301–1,900	9	10
>1,900	4	5
Income source:		
Salary	7	8
Wages	21	24
Private support	8	9
Public welfare	48	54
Other public support	4	5

[1] Mean age of children, 29 months; standard deviation, 11 months.

Table 30.—Number of persons per family

Income quartile	(Number)	2	3	4	5	6	7	8	9	10 or more	Mean	(SD)	Median
I	(239)	[1] 4	12	16	16	10	9	14	10	9	6	(2)	6
II	(241)	1	7	16	22	29	12	6	4	2	5	(2)	6
III	(321)	1	13	40	22	17	6	2	1	0	4	(1)	4
IV	(361)	2	31	39	21	5	1	1	<1	1	4	(1)	4

[1] Percentage of income group in horizontal line.

Table 31.—Number of hours mother or mother figure is away each week

Income quartile	(Number)	None	Less than 5	5 to 10	11 to 20	21 to 30	31 to 40	41 to 50	50 and more	Mean
I	(239)	[1] 5	62	10	8	3	2	6	3	9.5
II	(241)	7	48	22	9	3	7	3	2	9.7
III	(321)	9	41	19	6	7	7	7	4	11.8
IV	(360)	3	37	21	13	7	6	10	3	14.4

[1] Percentage of income group in horizontal line.

Table 32.—Respondent attitudes toward food preparation and recipes

Income quartile	(Number)	Likes to cook			Prepares new foods			Tries new ways of preparing foods			Uses printed recipes			
		No	Yes		No	Yes		No	Yes		No	Rarely	Yes	
			Sometimes	Always		Sometimes	Often		Sometimes	Often			Sometimes	Often
I	(239)	[1] 16	41	43	77	23	<1	57	38	5	33	15	39	3
II	(239)	13	32	56	71	26	2	46	45	9	21	11	56	12
III	(315)	9	30	61	66	33	1	40	50	10	15	10	61	14
IV	(359)	13	28	59	61	36	3	35	49	16	9	9	63	18

[1] Percentage of income groups in horizontal line for each characteristic.

Table 33.—How respondent obtains information about food

Income quartile	(Number)	Does not know	Recipe or cookbook	TV, magazines, grocery store	Neighbor or relative	Professional or public services
I	(235)	[1] 9	42	14	25	9
II	(233)	7	46	9	27	11
III	(310)	4	47	11	24	14
IV	(352)	2	48	14	21	14

[1] Percentage of income group in horizontal line.

Table 34.—Store used for major grocery shopping

Income quartile	(Number)	Kind of store		
		Small grocery or commissary	Supermarket	Discount market
I	(238)	[1] 19	73	7
II	(239)	10	85	6
III	(319)	9	80	11
IV	(358)	6	87	7

Income quartile	Store and reason										
	Small grocery or commissary				Supermarket				Discount market		
	(Number)	Trading stamps, quality, or convenience	Buy on credit	Lower price	(Number)	Trading stamps, quality, or convenience	Buy on credit	Lower price	(Number)	Trading stamps, quality, or convenience	Lower price
I	(45)	54	20	26	(174)	44	2	54	(16)	42	58
II	(23)	89	0	11	(202)	48	0	52	(14)	15	85
III	(28)	89	0	11	(256)	53	0	47	(35)	7	93
IV	(20)	94	0	6	(313)	63	0	37	(26)	19	81

[1] Percentage of each income group in horizontal line for each characteristic.

Table 35.—Demographic characteristics for low-income families of 12–47-month-old children with adequate dietary intakes and with low intakes [1]

Variable	Number	Socioeconomic rating scale [2]		
		2–3	4–5	6–7
Dwelling type	155 (84)	[3] 1 (0)	49 (35)	50 (63)
Dwelling area	155 (84)	1 (0)	61 (38)	49 (62)
Occupation, male wage earner	100 (58)	9 (1)	19 (25)	72 (74)
Income source	155 (84)	<1 (1)	67 (60)	26 (38)

Variable	Number	0–6 years	7–9 years	10–12 years	13–15 years
Mother's education	153 (83)	7 (11)	30 (37)	61 (53)	6 (1)

Variable	Number	White	Black	Latin	Other
Race	155 (84)	54 (38)	39 (57)	6 (4)	<1 (1)

[1] Intake from all sources. Numbers of children and percentage figures for children who had adequate calorie and nutrient intakes are unbracketed while those for children who had low intakes are enclosed in parentheses. Criteria for low intakes were: kcal./kg. <75 for 12–23-month-old children and <60 for 24–47-month-old children; protein <1.2 gm./kg.; calcium <400 mg.; vitamin A <100 IU/kg., and vitamin C <15 mg.
Based on scales for making primary ratings of four status characteristics, Warner, W. L.: "Social Class in America," Harper & Row, New York, 1960. The socioeconomic rating scale ranged from excellent, rank 1 to very poor, rank 7.
[2] Percentage of each group in horizontal line.

Table 36.—Respondent attitudes toward food preparation and recipes in low-income families of children with adequate dietary intakes and with low intakes [1]

Variable	Number	No	Yes		
			Rarely	Sometimes	Often
Likes to cook	150 (80)	[2] 15 (21)		36 (47)	49 (32)
Fixes new foods	149 (80)	73 (83)		28 (15)	0 (1)
Prepares foods new ways	148 (80)	52 (66)		42 (32)	6 (1)
Uses printed recipes	148 (80)	29 (43)	13 (19)	33 (25)	27 (11)

[1] Intake from all sources. Numbers of children and percentage figures for children who had adequate calorie and nutrient intakes are unbracketed while those for children who had low intakes are enclosed in parentheses. Criteria for low intakes were: kcal./kg. <75 for 12–23-month-old children and <60 for 24–47-month-old children; protein <1.2 gm./kg.; calcium <400 mg.; vitamin A <100 IU/kg. and vitamin C <15 mg.
[2] Percentage of each group in horizontal line.

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Food and nutrient intake of children from birth to four years of age

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The U.S. Department of Agriculture has made five nationwide surveys of household food consumption during the past 35 years. As a part of the most recent survey made in 1965–66, information was obtained on the food intake of individual members of the households interviewed. This was the first time in a nationwide survey that data were collected which provide for a comparison of levels of consumption by sex-age groups in the United States by regions, urbanization, and income classes. These data help in determining what groups of persons in our households have diets in need of improvement.

METHOD OF DIETARY APPRAISAL

Nationwide 1965–66 Survey of Diets of Men, Women, and Children

Reports of food intake for 1 day, the previous 24-hour period, were obtained for approximately 14,500 persons. This sample was drawn from 6,200 households included in the spring portion of the household survey. Data were collected during all days of the week including Saturday and Sunday.

Information was obtained on the kind, quantity, and method of preparation of foods and beverages eaten at home and away from home. The time of day food was eaten and the use of vitamin or mineral preparations were investigated also.

The nutritive value of the foods eaten was computed mainly from U.S. Department of Agriculture Handbook No. 8, *Composition of Foods: Raw, Processed, Prepared*, rev. 1963, and unpublished data of the Consumer and Food Economics Research Division. The data were computed in average quantities for groups of persons classified by sex and age. The average nutritive content of the food eaten by the different sex and age groups was compared with the 1968 Recommended Dietary Allowances (RDA's), Food and Nutrition Board, National Academy of Sciences-National Research Council, adapted to match the sex-age groups used in the study.

No information was obtained on the nutritional status of individuals. Therefore, no conclusions can be drawn on the existence of malnutrition or hunger.

Low-Income Families with Children from Birth to 4 Years of Age

Low-income households, in the 1965–66 survey, were assumed to be those with 1964 money income, after taxes, under $3,000. For the special purposes of this workshop, low-income households were classified as those with incomes under $4,000.

In addition to the average values computed for all sex-age groups, individual diets of children under 4 years were analyzed and distributions computed to show dispersion of consumption of foods and nutrients. These values may not be a good indicator of the quality of an individual's diet, since one day's food intake may not be typical of average food consumption by the individual. They should not be used in statements about the percent of children whose diets were above or below RDA's. They do permit, however, a detailed study of the different kinds and amounts of food used by children within defined levels of nutrient intake.

POPULATION CHARACTERISTICS

Income and geographic distribution of the sample studied are given in table 1. Children under 4 years were classified in household income groups of under $2,000, $2,000–$2,999, $3,000–$3,999, and $4,000 and over. Regions and urbanized areas, as defined by the Census Bureau, were also reported for children in the study.

Of the 719 children under 4 years of age, about half were boys. About twice as many children lived in urban as in rural households. Almost 30 percent of the children under 1 year lived in households with incomes under $4,000; almost 50 percent of the children 1–3 years lived in households with incomes under $3,000.

Information on race, age, education, and employment of the homemaker was collected for all households.

NUTRITIVE VALUE OF DIETS

Average daily dietary intakes of calories and five nutrients—protein, calcium, iron, vitamin A value, and ascorbic acid—are given in tables 2, 3. These nutrients were selected because of the general interest in protein intakes by persons on low incomes and our preliminary finding that calcium, iron, vitamin A value, and ascorbic acid are the nutrients most often found below recommended allowances in the diets of persons in the income class under $3,000 (*1*).

Primary emphasis should be given to comparisons of the average diets of the different age groups rather than to the individual intake values for calories and nutrients (tables 4–11). The averages provide data that are representative of the various age groups of children.

In reporting average nutrient intake, values for infants under 1 year are given for households with incomes under $4,000 and for those with incomes of $4,000 and over in four regions. Values for children 1 to 3 years are given for households with incomes under $2,000, $2,000–$2,999, $3,000–$3,999 in the North—which includes the Northeast, the North-central Region, and the West—and the South. The sample was not large enough to warrant separate tabulations for urban and rural classifications.

Infants Under 1 Year

Average nutritive values of diets of infants under 1 year of age met the RDA's for protein, calcium, and Vitamin A value in all age groups, income levels, and four regions of the United States. For protein and vitamin A value, average intakes were 2 to 3 times the recommended allowances. Average nutritive values show iron being very low for most groups tabulated.

Diets of infants 0–2 months old furnished about half the amount of iron recommended, except for infants at incomes under $4,000 in the Northeast. In the South and West regions, diets of 0–2-month-old infants in two income classes furnished about two-thirds of the allowance for ascorbic acid.

Infants 3–5 months old had diets which furnished less than two-thirds RDA of iron, except for the Northeast and West under $4,000, and the South over $4,000. Only two regions, South under $4,000 and Northeast over $4,000, did not meet the allowance for ascorbic acid, but met at least two-thirds of it.

Average diets of infants 6–11 months old met the RDA's for all nutrients studied except for iron and ascorbic acid. Iron intake was less than two-thirds of the allowances for all infants in the four regions and at both incomes. At incomes under $4,000, ascorbic acid was less than two-thirds of the allowance in the South; in the North-central and West, it was at least two-thirds. At incomes of $4,000 and over, infants in the Northeast approached the RDA's for ascorbic acid while infants in other regions were above it.

In general, iron and ascorbic acid seem to be the problem nutrients for infants under 1 year of age. In many instances, iron was about 34 to 70 percent below the recommendations. Ascorbic acid was from 26 to 37 percent low for infants 0–2 months, and about 6 to 37 percent for infants 3–11 months old.

About one-half of the infants from birth to 11 months used supplements during the 24-hour period of the survey. At incomes under $4,000, 42 percent of infants were given supplements; 54 percent were given supplements at incomes of $4,000 and over (table 12).

Children 1 to 3 Years

Average diets of children 1 to 3 years met the recommended allowance for protein and vitamin A value. In several age groups they averaged over twice the allowance.

The diets of children 1 and 2 years of age, except for those in the North with incomes under $2,000, furnished less than half the amount of iron recommended. Except for one group in the South,

the average values of iron intake by 3-year-olds were more than two-thirds the recommendation for this age group. However, as the Food and Nutrition Board has indicated, recommended allowances for iron are not expected to be met through ordinary foods by all sex-age groups (*2*). About 6 mg. of iron per 1,000 calories is all that might come from a normal U.S. diet, without additional fortification of foods beyond the present levels. On that basis, and considering that some caloric intakes were below recommendations, the normal diets of young children cannot be expected to meet the current recommended intake. Individual intakes of iron for 1 day were between 4 and 7 mg. for 56 percent of the children 1 to 3 years and below 4 mg. for 11 percent.

Except for some groups in the North, the diets of children 1 to 3 years were below the recommendations for ascorbic acid, sometimes by as much as 50 percent. Thirty-eight percent of the children had individual intakes for 1 day that were below 15 mg.

Calcium, on the basis of average quantities in the diets, was below the recommended allowance for children of ages 2 to 3 years but to a lesser extent than for iron and ascorbic acid. One-year-old children had average diets that furnished the amount of calcium recommended for this age.

Percentages of children with low intakes of calcium, iron, and ascorbic acid in the three income groups are shown in table 13.

When averages are below the recommended allowances for an age group, it is safe to conclude that some persons within that group have diets in need of improvement. Iron was the nutrient most commonly found below recommendations in the diets of children 1 to 3 years, either singly or along with other nutrients studied. It was most commonly found below recommendations, along with ascorbic acid, in diets low in two nutrients.

Urban children of ages 1–2 years, whose diets were below recommendations in iron only, used an average of about 3 cups of milk, 5 ounces of meat or substitutes, and 12 ounces of vegetables or fruits, including less than 1 ounce green and yellow vegetables and about 5 ounces citrus and tomatoes. Those below recommendations in iron plus ascorbic acid, or iron plus vitamin A value and ascorbic acid, used 2½–3 cups milk and 3–4½ ounces meat or substitutes. Those below recommendations in iron plus ascorbic acid only, used almost 5 ounces vegetables or fruits, including less than 1 ounce of citrus and tomatoes, while those also low in vitamin A value, used about 3 ounces vegetables or fruits. Those below recommendations in calcium in addition to iron, vitamin A value and ascorbic acid used less than 1½ cups milk, almost 4½ ounces meat or substitutes, and 3 ounces vegetables or fruits, including about 1 ounce citrus and tomatoes.

Practically all the children who met the recommendation for ascorbic acid used tomatoes or citrus fruit, while only a small number of those who were below the recommendation for this nutrient used these foods, usually in small amounts. Dark green and deep yellow vegetables were not used to any extent. Milk provided the major source of vitamin A value and ascorbic acid for those children averaging below recommendations in these two nutrients. The vegetable-fruit group needs the greatest increase in number of servings and improvement in choice of vegetable or fruit in order to meet the servings recommended for young children (*3*).

FOOD INTAKE

Kinds and amounts of foods eaten were tabulated by 12 food groups: Milk and milk products; eggs; meat, poultry, and fish; legumes and nuts; fats and oils; grain products; tomatoes and citrus fruit; potatoes; dark green and deep yellow vegetables; other vegetables and fruit; sugars and sweets; and beverages other than milk and juices. Quantities eaten and percent of persons eating are shown in table 14. Average amounts of some food groups consumed were low due to the small numbers of children using those foods.

Infants Under 1 Year

In the United States as a whole, at incomes under $4,000, infants' formula consisted mainly of whole milk and evaporated milk. At this income level, 56 percent of the infants had whole milk and 30 percent had evaporated milk.

Young infants (0–2 months) at the lower income level rarely consumed whole milk; consumption increased with age and income. Neither ready-to-use liquid nor dry formula was frequently used by infants at this income.

Of eighteen 0–2-month-old infants, 5 were on formula alone, and 11 were having baby cereal with their formula. Even after 3 months, 1 out of 37 infants was still consuming only formula, while the rest had either fruit or juice, cereal, meat and/

or eggs. Forty-three percent of the 3–5-month-old infants had at least formula and cereal.

At incomes of $4,000 and over, 71 percent of the infants had fluid whole milk, 10 percent of these being less than 2 months of age. At this income 10 percent of the infants under 1 year got evaporated milk, as compared with 30 percent for the lower income level. Consumption of evaporated milk decreased with age for both income levels as use of whole milk increased.

A greater variety of ready-to-use liquid formula was consumed by infants at higher incomes. At incomes of $4,000 and over, 17 percent of infants consumed ready-to-use formulas, compared with 10 percent using them at the lower income. Dry formulas were used by 6 percent of infants at higher incomes and by 2 percent at incomes under $4,000.

At incomes of $4,000 and over, 28 percent of 0–2-month-old infants and 4 percent of infants 3–5 months were consuming formula alone. About 10 percent of all children 3–5 months had eggs added to their daily food intake.

At both income levels, cereal seems to be the first and most popular solid food for infants 0 to 5 months of age. At low incomes, 49 percent had formula plus cereal and at higher incomes, 41 percent.

In the United States as a whole, the use of foods other than formula increased as age and income increased. Baby and/or junior vegetable and meat mixtures were used almost twice as frequently as meat and vegetable mixtures. These two mixtures make up a large part of the meat products consumed by infants under 1 year of age. Use of meat items started at about 3 months for both income levels. By 6 months, 33 percent of low-income infants and 38 percent at incomes of $4,000 and over had some meat mixtures added to their diets.

At incomes under $4,000, vegetables were infrequently used by young infants (0–2 months). In the 3–5 months age group, consumption increased only at incomes over $2,000. By 6 months of age, 35 percent were using vegetables. White potatoes, beans or peas, and deep yellow vegetables (mostly carrots and sweet potatoes) were the vegetables most frequently used.

At incomes of $4,000 and over, a larger number of young infants consumed vegetables. In the group between 3 and 11 months of age, 71 percent of the infants were consuming vegetables. At this income, deep yellow vegetables, beans, or peas, and white potatoes were the vegetables most frequently used.

At the lowest income (under $2,000), no fruit was used by the younger infants. Frequency of use increased with age and income. Fruits most frequently used by infants were apples and applesauce, citrus fruit and juice (mostly orange juice), and peaches, in that order.

At incomes of $4,000 and over, use of fruits was more common at an earlier age, use increasing with age. Again, apples and applesauce, citrus fruit, and juice were used most frequently, followed by pears and peaches. Apples and applesauce were used more frequently by all age and income groups than any other fruit.

Children 1 to 3 Years

It has been reported that only 10 to 20 percent of all persons in the various age groups in the 1965 survey ate any of the dark green and deep yellow vegetables in a day. (*1*) This fact coupled with Lewin's finding that people like what they eat rather than eat what they like (*4*) prompted an investigation of the vegetables used by 1- to 3-year-old children.

Dark green and deep yellow vegetables were used by 10 percent of these children in the North and by 18 percent in the South. Spinach, carrots, and sweet potatoes were used by the largest number, about 3 percent each, and collards by 2 percent. Broccoli, mustard greens, turnip greens, and squash were each used by fewer than 2 percent.

Potatoes were used by a considerable number of these children. Mashed potatoes were used by 16 percent; chips and fried, by 7 percent each; boiled and french-fried, by 5 percent each; and baked, by 2 percent. Potatoes in cream sauce and potato salad were used also.

Of the vegetables included in "Other Vegetables," corn was used by the largest number of children (about 10 percent), followed by green beans and green peas (about 7 percent each), cabbage (6 percent), and lima beans and lettuce (about 4 percent each). Asparagus, blackeye peas, green onions, cucumbers, sweet peppers, beets, and celery were used by smaller numbers of children; wax beans, cauliflower, eggplant, okra, olives, mature onions, radishes, sauerkraut, squash, turnips, artichokes, and red cabbage by none. Mixed vegetables were used by about 3 percent and vegetable soup by about 8 percent.

REGIONAL, INCOME, AND AGE DIFFERENCES

There was no significant difference (5 percent level) due to region, income, or age between the mean intakes of iron by infants and children under 4 years of age or between mean intakes of food energy and protein by children 1 to 3 years.

Mean intakes of vitamin A value by children 1 to 3 years appeared to be influenced by regional factors, the North having higher values than the South. The small number of cases combined with exceedingly high intakes by two children, however, may have influenced the test.

Both region and income influenced mean intakes of ascorbic acid by children 1 to 3 years. The North had higher values than the South. The means for the income class $2,000–$2,999 were lower than those of the income under $2,000 and the income $3,000–$3,999, the latter two being similar to each other.

There was a significant difference due to age in the mean intake of calcium by children 1 to 3 years and of calories, protein, calcium, vitamin A value, and ascorbic acid by infants under 1 year. Children 1 year of age had higher values than children 2 or 3 years old.

CONCLUSION

The data presented were compiled from a nationwide survey of the diets of men, women, and children carried out in the spring of 1965 by the U.S. Department of Agriculture. In the survey, no information was obtained on the nutritional status of individuals.

This report supplements the earlier reports by the U.S. Department of Agriculture on the dietary levels of individual members of households. It reinforces the need for increased consumption of vegetables and fruits generally, and of milk by some individuals, and the need for better food sources of iron.

This study of children from birth to 4 years of age showed that:

Average diets of infants under 1 year met the RDA's for more nutrients than did average diets of children 1 to 3 years.

On the basis of average diets of children under 4 years in low-income families (table 15), the major problem was low iron intake. Average intakes of ascorbic acid were also below recommended levels for some groups of infants under 1 year and children 1 to 3 years. Average intakes of calcium were below recommendations for some children 1 to 3 years.

Average diets were above the RDA's for infants and children under 4 years in protein and vitamin A value. Infants under 1 year were above the recommendations in calcium also.

Average intakes of calories by some age groups were below the allowances. Physical activity and body size of the children were not known, however.

Infants, in the United States as a whole, consumed more whole and evaporated milk than ready-to-use formulas. About two-thirds of the infants from birth to 11 months consumed whole milk, and 16 percent, evaporated milk. Ready-to-use formulas were consumed by 15 percent of the infants, 12 percent of which were in income classes of $4,000 and over. Dry formulas accounted for about 3 percent, and less than 1 percent reported using soy formulas.

Table 1.—Distribution of children by region, age, and income

Region and age	Number	Income class			
		I	II	III	IV
		Under $2,000	$2,000–$2,999	$3,000–$3,999	$4,000 and over
United States	719	97	112	216	294
Northeast:					
Total	157	8	14	49	86
0-2 months	19	0	1	5	13
3-5 months	36	1	1	2	32
6-11 months	51	2	2	6	41
1 year	17	2	3	12	0
2 years	23	3	5	15	0
3 years	11	0	2	9	0
North Central:					
Total	144	6	18	32	88
0-2 months	18	0	0	1	17
3-5 months	21	0	1	4	16
6-11 months	60	1	1	3	55
1 year	16	1	8	7	0
2 years	12	0	4	8	0
3 years	17	4	4	9	0
South:					
Total	316	73	67	103	73
0-2 months	19	1	3	5	10
3-5 months	44	9	5	10	20
6-11 months	79	13	10	13	43
1 year	45	12	11	22	0
2 years	59	15	20	24	0
3 years	70	23	18	29	0
West:					
Total	102	10	13	32	47
0-2 months	15	0	2	0	13
3-5 months	14	0	1	3	10
6-11 months	36	3	2	7	24
1 year	15	2	3	10	0
2 years	11	3	4	4	0
3 years	11	2	1	8	0

Table 2.—Nutritive value of food per person in 1 day, infants under 1 year

Age, annual income, and region	Food energy (cal.)		Protein (gm.)		Calcium (mg.)		Iron (mg.)		Vitamin A value (I.U.)		Ascorbic acid (mg.)	
	Mean	S.E.[2]	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
0-2 months:												
Under $4,000:												
Northeast (6)[1]	900	51	29.0	5.7	1,006	164	11.9	4.8	1,900	270	50	8
North Central (1)	605	0	11.6	.0	504	0	.4	.0	2,370	0	47	0
South (9)	711	51	27.6	4.0	971	138	3.6	.9	1,950	250	26	8
West (2)	762	184	25.0	11.8	849	351	1.8	.7	1,390	170	22	20
$4,000 and over:												
Northeast (13)	712	58	20.5	1.9	755	49	3.4	.6	3,530	910	38	7
North Central (17)	816	100	26.5	3.5	896	100	3.3	.9	3,950	820	40	11
South (10)	648	44	21.1	2.9	790	990	3.2	.9	1,920	270	22	7
West (13)	630	106	22.8	4.9	818	167	4.3	1.7	1,930	430	25	8
3-5 months:												
Under $4,000:												
Northeast (4)	982	120	31.2	5.3	936	190	8.3	4.3	5,130	1,090	77	25
North Central (5)	937	322	29.4	6.3	996	212	2.4	.9	3,320	1,490	55	30
South (24)	843	75	36.0	3.3	1,154	106	6.0	1.4	3,170	800	26	8
West (4)	890	140	25.6	3.5	793	126	6.6	3.1	2,540	750	46	16
$4,000 and over:												
Northeast (32)	842	53	32.0	2.7	899	76	5.2	.9	4,070	550	33	4
North Central (16)	823	66	29.8	2.3	908	71	3.8	1.1	5,120	1,010	46	10
South (20)	966	49	43.5	7.8	1,072	70	11.9	6.4	5,840	1,530	45	7
West (10)	873	139	28.4	5.8	832	155	4.0	1.0	3,990	1,220	68	18
6-11 months:												
Under $4,000:												
Northeast (10)	975	74	43.9	4.8	1,139	101	6.9	1.7	5,630	1,040	47	11
North Central (5)	925	95	43.6	4.0	1,264	94	2.2	.3	4,900	1,060	33	14
South (36)	1,045	56	46.6	2.9	1,199	76	6.1	1.4	4,470	860	22	3
West (12)	1,069	126	46.4	5.9	1,177	136	6.7	2.4	4,720	960	29	8
$4,000 and over:												
Northeast (41)	1,188	65	50.7	3.0	1,149	78	6.8	.8	5,980	900	34	5
North Central (55)	1,048	44	46.1	2.2	1,087	47	5.8	.7	4,180	330	40	4
South (43)	1,060	48	43.4	2.2	1,105	59	8.4	1.2	5,030	680	41	5
West (24)	1,036	56	52.6	5.6	1,110	80	7.5	1.3	7,530	1,370	38	6

[1] Number of infants.
[2] Standard error of mean.

Table 3.—Nutritive value of food per person in 1 day, children 1 to 3 years

Age, annual income, and region	Food energy (cal.)		Protein (gm.)		Calcium (mg.)		Iron (mg.)		Vitamin A value (I.U.)		Ascorbic acid (mg.)	
	Mean	S.E.[2]	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E
1 year:												
Under $2,000:												
North (5)[1]	1,214	127	53.8	4.9	1,107	133	8.0	2.9	4,530	1,700	65	21
South (12)	1,432	159	55.2	4.5	1,226	127	5.6	.9	2,810	510	29	8
$2,000-$2,999:												
North (14)	1,368	76	62.2	4.7	982	79	6.4	.6	3,200	580	38	9
South (11)	1,115	125	45.8	3.6	913	77	4.2	.6	3,250	1,220	22	10
$3,000-$3,999:												
North (29)	1,313	73	53.6	2.7	952	66	6.6	.8	4,120	780	44	7
South (22)	1,089	77	45.5	3.8	808	95	5.2	.6	2,900	530	32	7
2 years:												
Under $2,000:												
North (6)	1,556	148	64.2	5.6	1,020	37	8.5	1.4	13,920	10,740	86	21
South (15)	1,333	195	52.6	7.6	930	179	7.0	1.2	2,970	900	26	8
$2,000-$2,999:												
North (13)	1,187	95	47.5	4.8	632	67	6.6	.8	2,980	910	29	6
South (20)	1,300	137	51.0	4.6	762	70	6.0	.7	2,670	590	25	10
$3,000-$3,999:												
North (27)	1,410	98	53.0	4.2	839	46	6.3	.5	2,700	350	53	11
South (24)	1,465	89	54.6	5.0	685	64	7.2	.8	2,080	290	19	4
3 years:												
Under $2,000:												
North (5)	1,270	154	48.9	3.8	684	163	7.0	1.3	9,870	6,190	53	20
South (23)	1,570	173	62.0	6.4	846	154	9.8	1.1	2,930	450	23	3
$2,000-$2,999:												
North (7)	1,315	121	53.8	4.5	742	179	7.6	.7	3,220	1,110	30	8
South (18)	1,167	108	37.6	4.1	519	107	5.9	.5	3,580	1,120	27	8
$3,000-$3,999:												
North (26)	1,596	103	61.2	4.4	944	64	7.9	.7	5,720	1,840	50	9
South (29)	1,236	90	47.1	4.7	507	56	7.1	.7	2,540	370	30	8

[1] Number of children.
[2] Standard error of mean.

Table 4.—Frequency distribution of iron (mg.), diets of infants under 1 year

Income class	Age (mos.)	Number	Less than 2	2 to 3	4 to 5	6 to 7	8 to 9	10 to 11	12 to 13	14 to 15	16 to 18	19 to 21	22 to 24	25 and above
Under $2,000 (I)	0–2	1	0	1	0	0	0	0	0	0	0	0	0	0
	3–5	10	4	2	1	0	2	0	0	0	0	0	0	1
	6–11	19	3	8	2	1	4	0	0	1	0	0	0	0
$2,000–$2,999 (II)	0–2	6	3	1	2	0	0	0	0	0	0	0	0	0
	3–5	8	4	0	0	0	0	2	1	0	0	1	0	0
	6–11	15	1	5	3	3	1	1	1	0	0	0	0	0
$3,000–$3,999 (III)	0–2	11	2	2	2	0	1	1	1	1	0	0	0	1
	3–5	19	5	4	3	3	1	1	0	2	0	0	0	0
	6–11	29	3	8	8	4	1	1	0	0	1	1	0	2
Under $4,000: Total	0–2	18	5	4	4	0	1	1	1	1	0	0	0	1
	3–5	37	13	6	4	3	3	3	1	2	0	1	0	1
	6–11	63	7	21	13	8	6	2	1	1	1	1	0	2
$4,000 and over (IV)	0–2	53	18	16	6	7	2	1	1	1	0	1	0	0
	3–5	78	15	27	13	6	6	3	2	3	1	2	0	0
	6–11	163	9	45	35	22	16	6	14	4	2	2	4	4

Table 5.—Frequency distribution of ascorbic acid (mg.), diets of infants under 1 year

Income class	Age (mos.)	Number	Less than 15	15 to 29	30 to 44	45 to 59	60 to 74	75 to 89	90 to 104	105 to 119	120 to 134	135 to 149	150 to 164	165 and above
Under $2,000 (I)	0–2	1	1	0	0	0	0	0	0	0	0	0	0	0
	3–5	10	7	1	0	0	2	0	0	0	0	0	0	0
	6–11	19	8	7	2	1	1	0	0	0	0	0	0	0
$2,000–$2,999 (II)	0–2	6	2	0	1	2	1	0	0	0	0	0	0	0
	3–5	8	2	2	2	0	0	1	0	0	0	0	0	1
	6–11	15	5	8	2	0	0	0	0	0	0	0	0	0
$3,000–$3,999 (III)	0–2	11	3	1	2	4	0	1	0	0	0	0	0	0
	3–5	19	10	3	1	0	1	0	2	0	1	1	0	0
	6–11	29	8	9	2	3	1	4	1	1	0	0	0	0
Under $4,000: Total	0–2	18	6	1	3	6	1	1	0	0	0	0	0	0
	3–5	37	19	6	3	0	3	1	2	0	1	1	0	1
	6–11	63	21	24	6	4	2	4	1	1	0	0	0	0
$4,000 and over (IV)	0–2	53	25	5	4	9	5	0	2	2	0	1	0	0
	3–5	78	20	15	11	9	12	3	4	1	0	0	3	0
	6–11	163	39	52	23	13	10	9	6	4	5	2	0	0

Table 6.—Frequency distribution of calories, diets of children, 1 to 3 years

Income class	Age (yrs.)	Number	Less than 200	200 to 399	400 to 799	800 to 999	1,000 to 1,199	1,200 to 1,399	1,400 to 1,599	1,600 to 1,799	1,800 to 1,999	2,000 to 2,199	2,200 and above
Under $2,000 (I)	1	17	0	1	0	3	2	2	4	3	1	1	0
	2	21	0	0	5	1	4	0	4	3	0	1	3
	3	29	0	0	3	5	3	5	4	2	1	1	5
$2,000–$2,999 (II)	1	25	0	0	3	2	7	3	4	5	1	0	0
	2	33	0	0	4	8	4	7	5	2	1	0	2
	3	25	0	1	4	1	6	4	4	1	3	1	0
$3,000–$3,999 (III)	1	51	0	0	9	6	10	14	5	3	1	2	1
	2	51	0	0	1	6	9	12	9	4	4	2	4
	3	55	0	1	8	3	7	8	9	9	3	2	5
Total	1	93	0	1	12	11	19	19	13	11	3	3	1
	2	105	0	0	10	15	17	19	18	9	5	3	9
	3	109	0	2	15	9	16	17	17	12	7	4	10

Table 7.—Frequency distribution of protein (gm.), diets of children, 1 to 3 years

Income class	Age (yrs.)	Number	Less than 10	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 and above
Under $2,000 (I)	1	17	0	0	1	1	3	7	4	0	0	1	0	0
	2	21	0	1	2	5	2	2	2	3	2	1	0	1
	3	29	0	1	0	5	6	6	5	1	2	0	1	2
$2,000–$2,999 (II)	1	25	0	0	1	2	6	10	2	1	1	2	0	0
	2	33	0	1	2	8	9	4	3	3	2	1	0	0
	3	25	1	2	3	3	8	4	2	2	0	0	0	0
$3,000–$3,999 (III)	1	51	0	1	6	6	10	12	10	5	1	0	0	0
	2	51	0	2	2	9	10	13	6	4	1	2	1	1
	3	55	0	2	9	6	6	15	3	6	2	2	3	1
Total	1	93	0	1	8	9	19	29	16	6	2	3	0	0
	2	105	0	4	6	22	21	19	11	10	5	4	1	2
	3	109	1	5	12	14	20	25	10	9	4	2	4	3

Table 8.—Frequency distribution of calcium (mg.), diets of children, 1 to 3 years

Income class	Age (yrs.)	Number	Less than 200	200 to 299	300 to 399	400 to 499	500 to 599	600 to 699	700 to 799	800 to 899	900 to 999	1,000 to 1,199	1,200 to 1,499	1,500 and above
Under $2,000 (I)	1	17	0	1	0	0	0	1	1	1	1	3	4	5
	2	21	1	2	1	0	1	2	1	3	2	4	1	3
	3	29	5	2	2	2	1	1	2	4	2	2	3	3
$2,000–$2,999 (II)	1	25	0	1	0	1	1	1	3	1	5	7	5	0
	2	33	1	2	1	4	6	4	3	3	3	4	2	0
	3	25	7	0	3	3	2	4	1	0	1	2	0	2
$3,000–$3,999 (III)	1	51	1	4	2	2	3	5	3	4	8	8	5	6
	2	51	1	1	2	6	8	6	4	5	7	9	1	1
	3	55	5	5	4	7	2	5	4	6	2	6	9	0
Total	1	93	1	6	2	3	4	7	7	6	14	18	14	11
	2	105	3	5	4	10	15	12	8	11	12	17	4	4
	3	109	17	7	9	12	5	10	7	10	5	10	12	5

Table 9.—Frequency distribution of iron (mg.), diets of children, 1 to 3 years

Income class	Age (yrs.)	Number	Less than 2	2 to 3	4 to 5	6 to 7	8 to 9	10 to 11	12 to 13	14 to 15	16 to 18	19 to 21	22 to 24	25 and above
Under $2,000 (I)	1	17	1	1	7	3	2	2	0	0	0	1	0	0
	2	21	0	4	4	5	4	0	0	3	1	0	0	0
	3	29	0	0	7	8	4	3	1	0	5	1	0	0
$2,000–$2,999 (II)	1	25	1	5	6	8	4	1	0	0	0	0	0	0
	2	33	1	5	6	11	7	2	0	0	1	0	0	0
	3	25	0	1	8	6	9	1	0	0	0	0	0	0
$3,000–$3,999 (III)	1	51	0	8	15	18	3	4	2	0	0	0	1	0
	2	51	1	2	20	11	11	2	1	2	0	0	1	0
	3	55	0	5	14	14	8	3	7	2	2	0	0	0
Total	1	93	2	14	28	29	9	7	2	0	0	1	1	0
	2	105	2	11	30	27	22	4	1	5	2	0	1	0
	3	109	0	6	29	28	21	7	8	2	7	1	0	0

Table 10.—Frequency distribution of vitamin A (I.U.), diets of children, 1 to 3 years

Income class	Age (yrs.)	Number	Less than 500	500 to 999	1,000 to 1,499	1,500 to 1,999	2,000 to 2,499	2,500 to 2,999	3,000 to 3,499	3,500 to 3,999	4,000 to 4,999	5,000 to 5,999	6,000 to 6,999	7,000 and above
Under $2,000 (I)	1	17	0	2	2	1	2	2	1	4	1	0	1	1
	2	21	1	5	2	1	3	1	2	1	1	0	1	3
	3	29	1	4	5	2	0	5	3	1	3	0	1	4
$2,000–$2,999 (II)	1	25	1	3	0	4	3	5	5	1	0	0	0	3
	2	33	1	7	4	4	6	3	1	1	3	0	0	3
	3	25	1	6	2	1	3	6	1	0	0	1	1	3
$3,000–$3,999 (III)	1	51	0	6	5	5	8	7	4	3	5	1	2	5
	2	51	2	3	11	8	10	7	2	2	2	0	1	3
	3	55	3	5	8	10	6	2	6	3	1	1	3	7
Total	1	93	1	11	7	10	13	14	10	8	6	1	3	9
	2	105	4	15	17	13	19	11	5	4	6	0	2	9
	3	109	5	15	15	13	9	13	10	4	4	2	5	14

Table 11.—Frequency distribution of ascorbic acid (mg.), diets of children, 1 to 3 years

Income class	Age (yrs.)	Number	Less than 15	15 to 29	30 to 44	45 to 59	60 to 74	75 to 89	90 to 104	105 to 119	120 to 134	135 to 149	150 to 164	165 and above
Under $2,000 (I)	1	17	5	5	1	2	1	1	0	1	1	0	0	0
	2	21	8	3	3	2	0	1	0	2	1	1	0	0
	3	29	9	11	4	2	1	0	1	0	1	0	0	0
$2,000–$2,999 (II)	1	25	10	8	1	3	0	0	1	0	2	0	0	0
	2	33	16	9	2	3	1	1	0	0	0	0	0	1
	3	25	11	7	3	1	1	0	1	0	1	0	0	0
$3,000–$3,999 (III)	1	51	18	12	5	2	6	2	1	2	3	0	0	0
	2	51	19	13	7	1	0	4	0	4	2	0	0	1
	3	55	20	15	5	3	3	2	1	0	2	1	1	2
Total	1	93	33	25	7	7	7	3	2	3	6	0	0	0
	2	105	43	25	12	6	1	6	0	6	3	1	0	2
	3	109	40	33	12	6	5	2	3	0	4	1	1	2

Table 12.—Vitamin or mineral supplements, and race, infants under 1 year

Region and age	Income under $4,000							Income of $4,000 and over						
	Vitamin or mineral supplement				Race			Vitamin or mineral supplement				Race		
	Number	Using	Not using	Not reporting	White	Negro	Other	Number	Using	Not using	Not reporting	White	Negro	Other
Total	118	50	65	3	67	45	6	294	159	128	7	249	34	11
Northeast:														
0–2 months	6	4	2	0	5	1	0	13	4	9	0	12	1	0
3–5 months	4	1	2	1	2	2	0	32	17	13	2	31	1	0
6–11 months	10	5	5	0	7	3	0	41	25	15	1	36	3	2
North-central:														
0–2 months	1	0	1	0	1	0	0	17	10	6	1	17	0	0
3–5 months	5	2	2	1	3	2	0	16	8	8	0	14	1	1
6–11 months	5	2	3	0	3	1	1	55	20	35	0	49	4	2
South:														
0–2 months	9	5	4	0	5	4	0	10	5	5	0	9	1	0
3–5 months	24	8	15	1	11	13	0	20	17	3	0	17	3	0
6–11 months	36	13	23	0	21	14	1	43	23	18	2	27	15	1
West:														
0–2 months	2	1	1	0	2	0	0	13	8	5	0	11	1	1
3–5 months	4	2	2	0	2	1	1	10	6	3	1	7	1	2
6–11 months	12	7	5	0	5	4	3	24	16	8	0	19	3	2

Table 13.—Percentages of children 1 to 3 years, with low daily intakes of 3 nutrients

	Income		
	Less than $2,000	$2,000–$2,999	$3,000–$3,999
Number of children	67	83	157
Calcium:			
(<400 mg.)	21	18	16
(<200 mg.)	9	10	4
Iron:			
(<12 mg.)	82	99	89
(<8 mg.)	60	70	69
Ascorbic acid:			
(<15 mg.)	33	45	36

Table 14a.—Quantity of food per person in 1 day and percent eating—(infants under 1 year)

Age, annual income and region	Number of persons	Quantity per person in grams						Percent of persons eating					
		Milk and milk products[1]	Eggs	Meat, poultry, fish	Legumes, nuts	Fats, oils	Grain products[2]	Milk and milk products	Eggs	Meat, poultry, fish	Legumes, nuts	Fats, oils	Grain products
0–2 months:													
Under $4,000:													
Northeast	6	447		7			30	100.0		16.7			100.0
North-central	1	388						100.0					
South	9	643		7			8	100.0		22.2			55.6
West	2	509					28	100.0					50.0
$4,000 and over:													
Northeast	13	489		5			10	100.0		7.7			69.2
North-central	17	613		16			12	100.0		5.9			76.5
South	10	500					6	100.0					40.0
West	13	518					8	100.0					69.2
3–5 months:													
Under $4,000:													
Northeast	4	659	29	7			21	100.0	75.0	25.0			100.0
North-central	5	673	3			2	5	100.0	20.0			20.0	60.0
South	24	686	1	22		1	14	95.8	4.2	25.0		8.3	83.3
West	4	468		31	127		11	100.0		50.0	25.0		100.0
$4,000 and over:													
Northeast	32	614	13	36	26		21	87.5	15.6	40.6	12.5		84.4
North-central	16	739	[3]	24			12	100.0	6.2	31.2			87.5
South	20	790	13	28			11	100.0	25.0	45.0			75.0
West	10	504		20			11	100.0		50.0			90.0
6–11 months:													
Under $4,000:													
Northeast	10	854	36	72			16	100.0	40.0	60.0			80.0
North-central	5	1,039					31	100.0					80.0
South	36	769	26	58	12	6	33	97.2	36.1	52.8	13.9	33.3	94.4
West	12	751	16	94		3	22	100.0	33.3	50.0		33.3	75.0
$4,000 and over:													
Northeast	41	803	30	92	8	3	33	100.0	43.9	65.9	12.2	17.1	90.2
North-central	55	825	31	83	11	3	24	100.0	38.2	60.0	16.4	29.1	92.7
South	43	721	26	79	53	2	26	95.3	39.5	67.4	9.3	9.3	83.7
West	24	797	14	72	11	2	28	100.0	41.2	62.5	4.2	25.0	95.8

[1] Calcium equivalent.
[2] Flour equivalent.
[3] Less than 0.05 gram.

Table 14b.—Quantity of food per person in 1 day and percent eating—(infants under 1 year)

Age, annual income and region	Number of persons	Quantity per person in grams						Percent of persons eating					
		Tomatoes, citrus fruit	Dark green, deep yellow vegetables	Potatoes, white	Other vegetables and fruit	Sugars, sweets	Other beverages	Tomatoes, citrus fruit	Dark green, deep yellow vegetables	Potatoes, white	Other vegetables and fruit	Sugars, sweets	Other beverages
0–2 months:													
Under $4,000:													
Northeast	6	57			209	11		50.0			100.0	33.3	
North-central	1												
South	9	12	8		40	13	3	22.2	11.1		33.3	33.3	11.1
West	2				56						50.0		
$4,000 and over:													
Northeast	13	2	12		28	10		7.7	30.8		53.8	23.1	
North-central	17	6	10		53	1		11.8	17.6		41.2	23.5	
South	10		6		31	15			10.0		50.0	50.0	
West	13				36	9					38.5	15.4	
3–5 months:													
Under $4,000:													
Northeast	4	91	2		197			75.0	25.0		75.0		
North-central	5			10	82	2				20.0	80.0	20.0	
South	24	24	9	3	76	16		25.0	12.5	4.2	58.3	33.3	
West	4				146	(1)					75.0	25.0	
$4,000 and over:													
Northeast	32	18	18		152	4		18.8	31.2		87.5	15.6	
North-central	16	34	21		164	2		37.5	31.2		87.5	25.0	
South	20	32	14		157	27	5	30.0	30.0		90.0	30.0	5.0
West	10	65	14		58	23		40.0	40.0		70.0	20.0	
6–11 months:													
Under $4,000:													
Northeast	10	47	26		272	1		40.0	30.0		100.0	10.0	
North-central	5	25	9	43	105	14		20.0	20.0	60.0	60.0	60.0	
South	36	12	17	12	127	15	22	11.1	16.7	19.4	63.9	36.1	13.9
West	12	13	24	8	175	13	15	8.3	25.0	16.7	100.0	50.0	8.3
$4,000 and over:													
Northeast	41	30	17	4	248	9	16	19.5	22.0	9.8	87.8	26.8	9.8
North-central	55	33	10	14	233	2		21.8	12.7	20.0	90.9	25.5	
South	43	23	11	11	247	5	10	14.0	16.3	25.6	86.0	30.2	7.0
West	24	18	23	10	228	16	1	16.7	29.2	16.7	100.0	25.0	4.2

[1] Less than 0.05 grams.

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Table 14c.—Quantity of food per person in 1 day and percent eating—(children 1 to 3 years)

Age, annual income and region	Number of persons	Quantity per person in grams						Percent of persons eating					
		Milk and milk products[1]	Eggs	Meat, poultry, fish	Legumes, nuts	Fats, oils	Grain products[2]	Milk and milk products	Eggs	Meat, poultry, fish	Legumes, nuts	Fats, oils	Grain products
1 year:													
Under $2,000:													
North	5	843	16	227	2	9	33	100.0	40.0	100.0	20.0	40.0	80.0
South	12	749	45	57	21	12	63	91.7	58.3	75.0	25.0	58.3	100.0
$2,000-$2,999:													
North	14	671	40	113	15	25	71	100.0	57.1	78.6	35.7	57.1	100.0
South	11	658	30	55	12	4	65	100.0	45.5	63.6	27.3	45.5	100.0
$3,000-$3,999:													
North	29	680	27	108	10	17	61	100.0	44.8	93.1	20.7	58.6	100.0
South	22	530	35	86	11	7	42	95.5	50.0	77.3	18.2	54.5	90.9
2 years:													
Under $2,000:													
North	6	671	31	94	15	8	90	100.0	66.7	83.3	16.7	50.0	100.0
South	15	312	33	80	18	9	84	80.0	53.3	80.0	40.0	40.0	100.0
$2,000-$2,999:													
North	13	428	16	120	17	14	65	100.0	30.8	92.3	30.8	53.8	100.0
South	20	490	27	91	29	13	65	95.0	45.0	85.0	40.0	65.0	100.0
$3,000-$3,999:													
North	27	568	23	98	22	15	56	100.0	40.7	81.5	29.6	44.4	100.0
South	24	356	17	145	25	10	69	95.8	29.2	91.7	50.0	66.7	100.0
3 years:													
Under $2,000:													
North	6	440	15	61	15	18	88	83.3	33.3	100.0	33.3	66.7	100.0
South	23	356	34	164	20	15	103	69.6	43.5	95.7	21.7	65.2	100.0
$2,000-$2,999:													
North	7	422	27	79	47	13	91	85.7	57.1	71.4	42.9	71.4	100.0
South	18	258	25	59	31	8	80	66.7	44.4	66.7	50.0	55.6	100.0
$3,000-$3,999:													
North	26	650	24	104	37	14	80	100.0	46.2	84.6	50.0	65.4	100.0
South	29	278	21	114	23	11	64	82.8	41.4	96.6	34.5	62.1	100.0

[1] Calcium equivalent.
[2] Flour equivalent.

Table 14d.—Quantity of food per person in 1 day and percent eating—(children 1 to 3 years)

Age, annual income and region	Number of persons	Quantity per person in grams						Percent of persons eating					
		Tomatoes, citrus fruit	Dark green, deep yellow vegetables	Potatoes, white	Other vegetables and fruit	Sugars, sweets	Other beverages	Tomatoes, citrus fruit	Dark green, deep yellow vegetables	Potatoes, white	Other vegetables and fruit	Sugars, sweets	Other beverages
1 year:													
Under $2,000:													
North	5	100	.....	6	189	12	25	60.0	.....	20.0	100.0	40.0	20.0
South	12	27	4	9	50	23	34	16.7	8.3	16.7	50.0	41.7	16.7
$2,000-$2,999:													
North	14	39	8	29	155	10	113	28.6	14.3	64.3	78.6	42.9	35.7
South	11	23	12	9	25	9	190	9.1	27.3	27.3	54.5	27.3	72.7
$3,000-$3,999:													
North	29	52	2	43	162	32	48	31.0	6.9	44.8	86.2	65.5	24.1
South	22	52	6	11	76	12	93	36.4	13.6	27.3	50.0	40.9	54.5
2 years:													
Under $2,000:													
North	6	135	26	26	117	11	31	66.7	50.0	33.3	83.3	50.0	16.7
South	15	46	24	21	91	35	126	26.7	26.7	20.0	40.0	53.3	46.7
$2,000-$2,999:													
North	13	36	7	47	117	31	62	30.8	7.7	61.5	69.2	61.5	38.5
South	20	31	9	12	50	35	128	25.0	10.0	40.0	45.0	80.0	50.0
$3,000-$3,999:													
North	27	50	6	49	166	45	117	40.7	11.1	55.6	77.8	74.1	51.9
South	24	26	8	17	62	55	227	20.8	20.8	33.3	41.7	83.3	62.5
3 years:													
Under $2,000:													
North	6	59	16	18	90	29	113	50.0	16.7	50.0	66.7	50.0	33.3
South	23	7	10	11	93	49	125	8.7	17.4	26.1	69.6	60.9	43.5
$2,000-$2,999:													
North	7	52	.....	45	100	15	156	42.9	.....	85.7	85.7	57.1	71.4
South	18	33	14	19	170	41	306	22.2	11.1	38.9	50.0	77.8	83.3
$3,000-$3,999:													
North	26	66	3	26	161	35	94	26.9	3.8	46.2	69.2	65.4	34.6
South	29	47	9	21	103	39	173	20.7	20.7	48.3	75.9	69.0	62.1

Table 15.—Nutritive value of food per person in 1 day, United States, income under $4,000

Age	Number of persons	Food energy (cal.)	Protein (gm.)	Calcium (mg.)	Iron (mg.)	Vitamin A Value (I.U.)	Ascorbic acid (mg.)
0-2 months	18	774	27	943	6.0	1,890	34
3-5 months	37	876	33	1,070	5.8	3,330	38
6-11 months	63	1,029	46	1,191	6.1	4,730	28
1 year	93	1,255	48	962	5.9	3,440	37
2 years	105	1,373	53	787	6.7	3,270	35
3 years	109	1,388	53	709	7.7	4,000	34

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Discussion

Dr. Charles A. Valentine: When we review survey data, it is important to ask how valid the data really are. Not long ago, we and the Bureau of Census investigated precisely the same sample of people. They knew nothing of our procedures or intentions and we knew nothing of theirs. The questions were focused in considerable part on household structure—presence or absence of persons of various ages and sexes. The Census Bureau found the population to consist of 24 percent male-headed households, whereas we found 67 percent male-headed households. We found further that 62 percent of the males over 20 years of age were missed by the Census Bureau. In comparing the two sets of data, we could understand why every one of those males was missed and why the data on household structure were so distorted. These families have three major sources of income: conventional employment, public welfare and illegal activities of various kinds. It is literally impossible for the vast majority—probably 90 percent—of the households to survive with any kind of adequacy without making use of at least two of these three sources of income. Yet, one of the three sources of income is illegal in its own right and the other two are incompatible—one is illegal in the presence of the other.

Dr. Phyllis B. Acosta: I would like to point out too, that in Mexican-American communities many people may be in the United States illegally and constantly fear that they will be reported to the immigration authorities and be deported.

Dr. Valentine: The difference between our results, obtained by participant observation, and those of the Bureau of Census, obtained by questionnaire, illustrates the importance of participant observation in obtaining reliable information from low-income groups.

In any questionnaire approach there will be the difficulty of deciding whether the information obtained reflects actual behavior or whether it merely reflects what people *say* they do. This is true of answers to questions relating to income and also to quantities and patterns of eating.

What seemed to me striking about most of the comparisons reported to us by Kram and Owen and by Eagles and Steele is the relatively minor difference in food selection from one income level to another. The extent of this similarity may actually be less than that reported. Regardless of what people eat, most people know what they are expected to eat. They tend to answer questions in terms of these understood standards. They may not deliberately falsify, but they are most likely to shade their responses to agree with the expectations of the questioners. Results obtained from this type of study need to be questioned and checked continuously against direct observation.

Dr. Virginia H. Young: Another problem of the questionnaire approach is that it requires the person being interviewed to translate behavioral data into verbal terms. This isn't always an easy transition. It doesn't mean that these people are less articulate—merely that the vocabulary of the questioner may not be one by which the respondent thinks of his behavior.

Dr. George M. Owen: On the other hand, if a person came to my door and asked questions of a personal nature, I could probably relate more effectively to the stranger than to the person who lived around the corner. The anonymity that goes with talking to a total stranger may increase willingness to be honest and frank.

Miss Faustina Solis: But your background is quite different from theirs. Most probably you have little to fear from "the authorities." In low-income groups the respondent will ask himself, "Where does this person come from? What is he going to do with the information I give him? Is this for my benefit or my detriment?" The low-income re-

spondents have many doubts and will be very guarded in their responses. I seriously doubt that these people can relate readily to someone from the dominant culture.

Mrs. Elsa Alvarez: If a total stranger came to a door in the neighborhood where I work and asked some questions about food or income, the first thing that would come to the mind of the person being questioned is that this man belongs to the FBI or police, or is a bill collector. Many people in the neighborhood are hiding from the authorities.

Dr. Eagles: We are acutely aware of the problems in obtaining valid food intake data. There is no question that the difficulties are more serious among the lowest income groups and among individuals whose language or vocabulary differs greatly from that of the interviewer.

Dr. Ogden Johnson: The methods themselves—the questionnaire versus participant observation—are probably not as important as the people who use them and how they are used. That an outsider may not be able to ask the question properly or to evaluate the answer is really separate from the validity of the methods. Participant observers may be poorly trained, biased or otherwise scientifically weak. Their results may therefore be worthless but this does not mean that the method is faulty.

Dr. Valentine: That is a fair comment. When I spoke of "the questionnaire method," I meant one that is used by outsiders. Quite a number of persons in the low-income, Afro-American community where we live are aware that we know the composition of their households, but they never speak of this directly. In fact, they do not speak of it even among close friends and relatives.

The problem of questionnaire data is a general one and applies to most information obtained. Virtually all of our mothers told us they gave their child a great deal more milk than they actually did. They were not trying to deceive us but merely had in their minds the notion that "the experts" recommend milk very highly as a food.

Dr. Acosta: I don't think mothers over-report the use of milk because they want to please us. On the basis of 24-hour recall data that I have obtained in clinics, I am convinced that mothers generally overestimate the amount of milk used by about 10 percent. When we ask for a 3-day written record, we get a much truer picture of what the child is really consuming. Again, if we establish rapport with these families and if they know why we want the information, we will come much closer to learning what the child is actually eating.

Dr. Eagles: Table 14–D in our paper presents questionnaire data on the use of beverages other than milk and fruit juices. These beverages are chiefly soft drinks. The people questioned could hardly have thought that "the experts" were enthusiastic about giving soft drinks to small children. Yet, as the intake of fluid milk decreased, an increase in the use of soft drinks was noted, with as many as 80 percent of 1- to 3-year-old children receiving them.

Miss Mary C. Egan: Many nutritionists working in community health facilities have become identified with the community without necessarily living in it. They have developed rapport with the families and I believe that their information will compare favorably with that derived by the participant observation method. It may be a dangerous overgeneralization to suggest that a nutritionist cannot be effective unless he or she lives in the community. Neither do I think we should conclude that direct observation is the only way to gather valid data.

Miss Barbara Garland: Having just completed 6 months of surveying, I do not believe that people care what they tell you. They're not hiding information as to what they eat. They don't know that much about it and they just don't care. I think it is wrong to assume that they will not tell you the truth.

Dr. Valentine: You may be right. My own conviction is that people generally are poor observers of their own behavior. Let us do more studies in which the two methods are directly compared. The more of these results we view, the better guidance we will have.

Mrs. Mary Ellen Wilcox: I should like to ask Mrs. Kram and Dr. Owen whether the word "snack" was their term or one used by the respondents.

Miss Catherine Cowell: I am also concerned about the word "snack." To many families this will imply foods that were purchased separate and apart from food available in the home.

Mrs. Kathryn M. Kram: Actually, our interviewers rarely used the word "snack." The interviewer merely asked the respondent to report every food the child put into his mouth and allowed the respondent to label the intake as a "meal" or a "snack."

Mrs. Wilcox: When you speak of parental control of the child's eating patterns. does the response include quantity of food consumed?

Mrs. Kram: In the questionnaire portion of the survey protocol, quantitative data were not sought—merely type of food and time of eating. Only in the diet record collected in the home by the interviewer were quantities of food recorded.

Dr. Acosta: Were there differences in snacking patterns in relation to the presence or absence of a father in the home? I suspect that eating patterns are more structured when the family unit is complete.

Mrs. Kram: We asked, "Who feeds the child or who sees that food is prepared?" Then we asked, "Does anyone have an influence on foods eaten in the evening or at bedtime?" Our data on family eating patterns are not fully analyzed.

Dr. Acosta: We need more information about calorie requirements of children who are poorly clothed and are reared in unheated or poorly heated homes. Requirements may be greater for such children than for those reared in well-heated homes.

Dr. Young: We should also obtain more information about the effect of rearing children in overheated, middle-class homes.

Dr. Owen: In Mississippi, we noted that rural black preschool children from the lowest income group slept an average of 1½ hours longer each day than did children from families with greater income. Increased sleep could be a compensatory response to relative unavailability of calories, or could be simply a method of keeping warm.

Rural low-income groups

Dr. Virginia H. Young, Session Chairman: As we now turn our attention to various low-income groups, we should recall that within each cultural group people act and think on two levels. First, they are participants in the general American culture. They participate to a great extent in certain general American values—the belief in equal opportunities and certain evaluations of health and in attaining a better standard of living. This affects goals and behavior. At the same time, they are operating at another level that encompasses behavioral styles, concepts and concerns of their own culture. Attitudes of the adults will affect care of the child, including feeding and nutrition. In some cases this second level of operation will be weak and easily displaced by that of the dominant culture. In other instances it will be strong and cannot readily be displaced.

Child feeding in the rural low-income family

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FAMILY DIFFERENCES AMONG THE RURAL POOR

When we attempt to understand feeding practices of infants and children in rural low-income families, we need a better understanding of how the rural poor family differs from the more affluent family in background before determining the specifics of what and how the infant and young child within this group are fed.

"There are several conditions in life that influence the assortment of foods a person will eat. One is the socioeconomic level into which a child is born." (*1*)

In what respects do rural low-income families differ from families higher on the income scale? In 1968 an estimated 25 million people—one-eighth of the population—had incomes below poverty level.

Thirty-seven percent of households surveyed in 1965 that had incomes below $3,000 met NRC allowances for all seven essential nutrients measured, according to a bulletin on the National Food Situation outlook from the Economic Research Service.

Almost one in every two *rural* families has a cash income of less than $3,000 per year. One-fourth of all rural nonfarm families are without running water (*2*).

Mr. George H. Essex, Jr., of North Carolina, in describing the rural poor in a section of North Carolina, stated in hearings before the National Advisory Commission on rural poverty:

> The average resident (rural poor) has less education, a more dilapidated house, poor health, less chance of becoming trained or employed, less chance of seeing his children finish high school; he is more isolated and has fewer assets than his urban counterpart—a good chance he has no water or sewage facilities other than a well or outdoor privy. . . . He doesn't know of benefits or resources in the county.
>
> He wants for himself and his family the same things you and I do, a decent standard of living, education and a better life. . . . The poor in rural America are getting neither a proper nor a proportionate share of our natural resources or concern. Yet one-half of our people live in rural America where we continue to stockpile poverty in the midst of plenty.

Mrs. Edna Tolson of Brandywine, Md., stated: "I think poverty in the rural area is a little more extreme simply because there is no transportation and everything is so far apart." (*3*)

About 13 percent of all white children and 49 percent of all nonwhite children were members of poor families in 1966. The incidence of poverty was highest (78 percent) among children in nonwhite families headed by a woman. In 1966, among both nonwhite and white poor families, one out of three children was under 6 years of age.

Of the 12 percent of 48.9 million families in the United States who were classed as poor in 1966, 5.6 million were nonfarm and 0.5 million were farm families. Even on farms, gardens are not always productive—in cotton regions spray may kill garden produce; in the Ozarks, soils may have low productivity; on the steep mountainsides of the Appalachia coal mining area, few gardens thrive.

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So being a rural poor family does not always mean that food is produced at home to supplement income.

Rural adults in the poverty class lag almost 2 years behind urban adults in years of formal schooling. Rural children receive one-third less medical attention than urban children. (*4*).

According to an article, "White Americans in Rural Poverty" by the USDA Economic Research Service, rural poverty may be classified into three types (*5*). Type I consists of predominately white populations in southern Appalachia, the Ozarks and Upper Great Lakes Region. These areas are "usually isolated and lack the arteries of communication and transportation that are necessary for economic growth. Many times there is a long history of intergenerational poverty." Because some of the so-called farms in the Ozarks region are so low in productivity, often the families must work for an off-farm income or depend on welfare aid.

Type II is the migrant family (to be discussed elsewhere in this conference).

The article states: "Type III is a relatively depressed area with a poor white minority within a poor nonwhite majority. These include small plot farmers and tenant farmers. In this group there is continuous out-migration to northern cities. There may be more interracial contact in these groups. There may be poorer educational facilities here. Less jobs are available in this area. There is little experience with instruction in community activities. This group is least informed on possible benefits and may entail relatively major short-term personal and family sacrifices." (*5*).

In an article on "The Extra Cost of Being Poor," Trienah Meyers, staff assistant to the administrator of the Economic Research Service, USDA, states from study and observation that it actually costs more to be poor—economically, educationally, psychologically, and physically. For example, whereas the more affluent family can go from one store to another in the city for the best buy in food, the rural poor are fenced in by economic barriers so that they are forced to buy from the nearest store. In some instances, prices have been raised about the time welfare checks arrive. Storage facilities may be so poor that the family cannot take advantage of good "buys" that may be available to them (*6*).

In a hearing before the Select Committee on Nutrition and Human Needs of the U.S. Senate, David O. Cox stated:

> Care of infants of the poor shows some differences from that of the more affluent:
> 1. The parents are generally of a lower order of literacy
> 2. They are exposed to fewer broad, cultural experiences because of geographic and social isolation
> 3. They generally lack knowledge of nutrition
> 4. Nutritional needs of the breadwinner or potential breadwinner generally receive greatest emphasis*
> 5. Much rural water supply has potential for contamination by pathogens and nitrates
> 6. Many families lack normal sanitary facilities
> 7. Care is more often provided by parent surrogates—older children (sometimes by only a few years), often disinterested relatives or neighbors
> 8. More of the families are fatherless, with resultant additional strain on mothers and older siblings
> 9. These infants receive much less medical supervision, which decreases opportunities for nutritional guidance of the mothers and for correcting the infants' nutritional problems early.
>
> . . . quite often there is little continuity between hospital feeding and what is available at home (*7*).

So far this discussion has been on some aspects of the picture of the rural family in poverty. How does all of this have a bearing on infant and child feeding? With less family mobility than the more affluent or urban household, children of the rural poor are frequently started on food the family can afford to buy from a market which may be more limited than city markets. Educationally as well as economically there are handicaps to better nutrition. The child may be exposed to less variety from the family table when he starts on "table food." It may also mean he is started on "table food" earlier because prepared baby food is less available to the family.

BREAST VERSUS BOTTLE FEEDING

What is the prevalence of breast feeding as compared to bottle feeding for the infant of the rural low-income household? In 1966 a survey in-

*My own observations in Arkansas and Tennessee are in agreement with this comment. Women and children come last, particularly in relation to protein-rich foods.

dicated the areas with greatest incidence of breast feeding were the suburbs and the inner city slums. In a review of infant feeding practices Meyer states:

> The incidence of this ancient art [of breast feeding] has declined over the last 40 years due to many complex anthropologic and sociologic factors . . . the decline in the last 10 years is less precipitous and it is hoped in some circles that the trend will be reversed. It has become the "in" thing to breast feed the infant among the intellectuals as well as in areas of the academic community. So, too, has it become popular in higher economic levels of our social order.
>
> In 1930 it was popular to leave breast feeding and turn to the new more popular process of "formula" feeding. Then, as now, the new mothers of higher levels of our culture set the pace . . . now breast feeding is the new life style.
>
> It is hoped that this new sociologic concept will operate here—that the trend toward breast feeding will seep through to the lower strata of the cosmic pile, and that more of it will occur where it would be of greatest benefit psychologically and economically (*8*).

Perhaps if this keeping up with the "in" thing does operate here, it would have advantages especially for the poor.

Some specific comments of persons with experience among the rural poor in the United States would be of interest here:

Dr. Frances C. Rothert, former MCH Director in the Arkansas State Board of Health, stated:

> The Maternal and Child Health Division of the Arkansas State Board of Health made studies of the feeding practices some time during the 1950's and found more breast feeding in rural areas and much less illness among breast-fed babies. Studies also revealed that babies weaned directly to the cup and who had spoon feeding of early supplements did better than those weaned from breast to bottle. The usual age for weaning varied greatly (*9*).

Apparently in the last 10 or 12 years rural Arkansas practice, too, has changed, as evidenced from a more recent comment of a nutritionist from the central Arkansas region around Pine Bluff, Ark. She stated:

> Most of the mothers receiving Health Department services elect to bottle feed their babies. Most of the problems related to formula are related to sanitation rather than composition. Even in the low-income families there is often too much milk volume. This in turn creates a feeding problem of ingestion of other foods. Sometimes babies of young mothers are left with the grandmother, even great-grandmother, who have firmly ingrained ideas on feeding and child training. By the time the child has reached his third year he is following the eating pattern of those with whom he lives (*10*).

Hutcheson, from his experience in private and public health practice, commented on infant feeding by saying:

> I would say that bottle feeding is much more common than breast feeding, that most mothers have a tendency to feed milk in such quantities that the baby's appetite for other foods may be minimal, that many mothers believe it is important to get the baby on homogenized milk as quickly as possible. The usual age for weaning is after 1 year old (often after 2). A prevalent usual meal pattern is carrying about a bottle wherever you go so that the baby has milk whenever he wants it.
>
> The use of "table food" is often emphasized by low income rural families and, as a result, the children's nutrition suffers since the type of table foods that can be managed by babies are such things as mashed potatoes and gravy that are easy to swallow but may not have the nutrients needed by the baby or child (*11*).

One project nutritionist from Mobile, Ala., stated some mothers seemed to have the belief that "the more milk the better. Some older babies were reported to drink from one quart to one-half gallon of milk per day. Mothers of these babies complain that the babies won't touch solid food anymore" (*12*).

According to Filer and Martinez, reporting on the intake of infants in the United States, "iron is the nutrient most often in short supply—more than half of infants do not get the lowest recommended provision. Amounts of solid foods containing iron are not eaten in sufficient quantity to provide the iron babies need. Since milk is ingested more freely, a formula containing iron would be an advantage to these babies" (*13*).

The prevalence of mild nutritional anemia appears to be common among low-income groups as indicated in the Mississippi study by Owen et al, (*14*) the study reported by Hutcheson from rural Tennessee (*15*) and others. Does some of this also reflect poor intake of supplementary foods because milk quantity is large?

In an unpublished study of infant feeding practices in well-baby clinics in Knox County, Tenn., 1967, 31 mothers fed their babies as follows: 18 used a proprietary formula (of this group 12 used the formula given at the hospital); 10 used evap-

orated milk; two were breast feeding; for one, the type of feeding was unknown. Of 11 of the infants who were 6 months of age, two were on a proprietary formula, four on evaporated milk and five on homogenized milk; the others in the study were under 6 months of age (*16*).

In the coal mining region of three counties in eastern Kentucky, the study of infant feeding practices of 38 mothers ranging in age from 10 to 49 years showed that the majority bottle fed their babies. The long child bearing period of the women in this area was strongly evident in this group's age range. The interviewers in this study found no correlation between what the mothers fed as first solid food, the mother's age, education, number of pregnancies or weekly food budget (*17*).

In another study in Sullivan County, Tenn., in July, August, and September 1970, not one of 36 mothers interviewed breast fed their infants (*18*).

Robertson in reporting on breast feeding practices reports that "variation in maternal age, urban or rural residence and whether the infant was under the care of a pediatrician or practitioner did not correlate with significant differences in the incidence of breast feeding at 1 week of age." He concluded that a "complex of cultural factors rather than a particular personality pattern of the mother or the specific attitude of her attending physician is primary in influencing her choice of feeding technique. Regional location of the maternal residence was found to be associated with the most significant variations." (*19*). Apparently some of the comments and studies reported herein reflect this same complex pattern in cultural values.

One project reporting on bottle feeding found the practice of introducing alcoholic beverages into the baby's bottle in order to make him sleep through the night (*20*). Although undocumented, one nutrition worker stated some babies are given tranquilizers to keep them quiet.

SOLID FOODS

Dorothy Lee, in discussing "Cultural Factors in Dietary Choice," says that culture decides "when we should have an appetite for what" and even what constitutes food.

> Culture frequently dictates what the first solid foods given to infants will be. In our society, the infant may have a hard metal spoon introduced into a mouth which has never experienced anything so solid or hard, a mouth in which teeth have not yet erupted. In Polynesia the infant may get premasticated food warmed in the mother's mouth partially predigested with her salivary juices from which a mother puts food with her lips into the mouth of the baby (*21*).

Lest one suppose the latter practice is far removed from present-day United States, it should be noted that the practice of prechewing food for the infant, although infrequent, was reported in recent years by Children and Youth projects in Columbus, Ohio (*20*) and North Central Florida (*22*); Maternity and Infant Care projects in Dade County, Fla., (*22*) and Houston, Tex. (*23*); and the health department in Jefferson County, Ark. (*10*).

Who influences the mothers in choice of foods for infants?

In a study of prenatal diets made in Charleston, South Carolina:

> Those mothers living in rural areas tended to exhibit more peculiar food habits than those living in towns or in the city. Moreover, if a grandmother was living under the same roof, she appeared to be the most influential factor contributing to any peculiar idea which they had about food. Opinions voiced by elders were believed and respected (*24*).

"Many young mothers take their mother's or grandmother's advice when it comes to questions on feeding the baby," according to a report from Alabama (*12*).

In the Sullivan County study (*18*) regarding the feeding of 110 babies, it was found that advice was sought from the following:

The family physician, by 40 mothers;
Relative or friend, 25 (the mother or grandmother being the most frequent);
The public health nurse, 21 mothers;
Twenty-five mothers "just decided" on their own when to feed supplementary food;
One learned from a book; some gave multiple answers.

When were solid foods first introduced into the child's diet?

The earliest time for adding solid food noted in this review was reported by an Atlanta project, which found the following foods being added at 7 days of age: three 3-ounce bottles of milk, scrambled egg, steak fat, cornbread and bean juice. Babies younger than 6 weeks were given snow cones, tea, catnip tea, potato chips, etc. (*25*).

Most project reports reviewed in the southern region listed the usual time for addition of first food as being from 1 month to 6 weeks of age.

What types of foods were introduced first?

A number of studies reported cereal given in the bottle. Other solid foods frequently included rice, grits, mashed beans, pot liquor (frequently with bread in it), mashed potatoes and gravy made from lard or grease from fatback (*26*).

In north-central Florida, extras such as soda pop, Kool Aid, and iced tea with a lot of sugar, were frequently introduced at 1 month of age. The soft inner flesh of fried fish was also given. In the same report, custards and fruit desserts were said to be given as first foods by almost all mothers. Meat with vegetables was preferred and baby meats alone seldom given (*22*).

In Attala County, Miss., at 1 month to 8 months of age, mashed biscuit and syrup, gravy, pot liquor, cornbread, rice, and boiled fatback were part of the common fare (*27*).

Most of the project reports reviewed indicated that by 8 months to 1 year of age most children were on "table foods." In many poor families it seemed that less milk than would be desirable was consumed. In some poor families children were started on table foods as early as 6 months. However, as indicated previously, these generally seemed to be soft foods, i.e., grits, rice, potatoes, gravy, pot liquor.

Beer was mentioned in several reports as being given to young children, along with soft drinks and snacks.

Bryan and Anderson, in a study of 119 cases referred for crippled children services in 1963, stated they were impressed with the limited number of foods in the diets of low-income families. "In many of the families only one food, i.e., a large pan of biscuits or when sweet potatoes were inexpensive, a large pan of these, was cooked in the morning and left out for the children to eat whenever they want them." The children in their study generally had few food dislikes; nevertheless it was noted that even one or two food dislikes can be critical when the variety of foods available is so strictly limited (*28*).

Another comment bears out this same pattern: "In the fall, sweet potatoes are eaten daily until the bushel purchased is exhausted." (*10*).

The habit of reporting information by color rather than by income fosters the habit of attributing to ethnic background differences that in fact derive chiefly from socioeconomic status (*29,30*). Crim, discussing nutritional problems of the poor, states:

> Meals of the Southern Negro resemble those of the same socioeconomic class of whites. For example, one chicken may be cooked for a family of eight to 10 and fruits and milk are not usually included in the diet. When families move to the city, green or yellow vegetables are even more difficult to obtain so there is even more drastic reduction of intake of vegetables in urban communities. (*31*).

It is clearly important for the pediatrician, the nurse, the nutritionist, the social worker, anthropologist, etc., to have facts regarding the local and regional dominant cultural patterns and family environment before attempting to enhance the nutritional pattern.

The studies reviewed indicate that there are many questions yet to be resolved regarding feeding practices among the rural poor before we can be fully effective in helping the families realize better nutrition for their children. We need more indepth studies of actual feeding practices and factors influencing attitudes regarding food, the role of parents, and of other social and environmental factors that accompany malnutrition. (*32*).

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Discussion

Dr. Virginia H. Young, Session Chairman: The limited number of foods in diets of low-income rural families impressed me also in the small-town Negro group which I studied.[1] As one man said, "It hurts to eat beans, potatoes and cornbread all the time, but that's what we eat." And, indeed, the odor of beans slowly cooking on the stove hung over most of my conversations in these homes. The field peas and okra, the greens, the chickens and spareribs were spoken of with relish and pride, and the vitamin supplements were squirted into the children's mouths in the yards as public symbolic actions. The kitchen tables in shacks in rural hamlets outside the town limits were occasionally heavy with quart jars of peaches and "soup mix" put up by older women who had been taught to can by a home economist with the Department of Agriculture some years ago. The younger women had never been taught home canning and I saw none doing it.

My impression was that limited diets were not a matter of choice. With adequate resources these people's food preferences would provide them much better nutrition. It is important to establish whether poor diets are the result of relatively objective factors such as income and shopping facilities or whether poor diets result from food preferences or food habits. Obviously, remedial measures are very different in the alternative circumstances.

We lack general estimates of the receptivity of our rural low-income people to better nutritional standards and of their ability to utilize improvements. How inclined are they to accept advice given through professional channels? How capable are they of carrying out the advice? How appropriate is the general context of care?

My own research on child care among Negroes in a Georgia town indicated a high level of competence and attentiveness in child care. Social institutions provided for the security of the child and an extended network of responsibility for him. It showed utilization of child health facilities and professional advice. In this town the nutritionist would be dealing with a population ready and able, in terms of values, food preferences, child care systems and social institutions, to raise its standards of nutrition. The main visible problem is lack of access to more costly foods.

Many of the obstacles to improved nutrition within the cultures of low-income rural people arise from the misapprehension of habits of which the investigating culture disapproves. An example is the commentary by Cox quoted in Miss Jones' paper. He seems to suggest that because the care of infants of the poor is different from that of the affluent, it is less beneficial. When care is provided by parent surrogates among the poor, is it inferior to that provided by parent surrogates among the middle class, by the perhaps indifferent or hostile servant or by the high school babysitter? We have to ask how well the low-income mother has trained the nurse-girl, whether she supervises her, and if the relatives' care is really disinterested. I found that the nurse-child was usually competent, fully familiar with family practices, and highly motivated to carry out her mother's directions. The use of child tending groups with a nurse-child in charge was an important part of the social structure, and was constructive in the adjustment and training of children of all ages. Relatives in the town I studied seemed generally to give excellent care and to have real concern for children in their charge.

We also have to ask other questions of the Cox generalizations. Does the absence of a father place more strain on mothers and older siblings? New analyses of mother-headed families suggest that they are a much more viable cultural form than used to be assumed. The greater independence of women in the Negro cultural tradition, and the different traditional values associated with raising children out of wedlock, make the woman who shares these traditions able to head a family successfully. The strength of close kin ties also lends support to the mother-headed family.

[1] Young, V. H.: Family and childhood in a southern Negro community. *Amer. Anthrop.* 72: 269, 1970.

What are the grounds for Cox's statement that the nutritional needs of the breadwinner receive greatest emphasis? I do not believe this pattern is prevalent in Negro families and I doubt that it is widespread among whites.

We can also look more closely at the suggestion that geographic and social isolation lead to inferior child care. To estimate the quality of care it is necessary to examine the strength of local social institutions, including both the role of medical and nutritional resources in the community, and the customs of child care. Access to health care and professional information may, of course, constitute problems among rural populations, and as Miss Jones points out, inadequate transportation among the rural poor deters advantageous shopping practices. These reflect problems of access and availability to a much greater extent than they reflect inability, or lack of inclination to accept such advantages. Customs of care, however, must be distinguished from external factors of this kind. These customs cannot be graded according to their closeness to cosmopolitan trends. Their quality probably depends mainly on the general vitality of the local culture.

An impediment to understanding people arises not only from ethnocentric judgments but also from lack of awareness of cultural context. Knowledge of food habits signals the areas where the mother does nutritional right and wrong and suggests how the nutritionist can make her advice more acceptable to the mother. In addition, food habits are part of a large area of associated habits, and all are tied up with family organization and community social structure. The nutritionists who suggest that people change their food habits may be suggesting not one simple change, but ramifying changes, because any habit is embedded in a web of behavior and institutions. Change is sometimes easy; sometimes habits are readily taken up or practices abandoned as though with a sigh of relief, but sometimes change causes disruption beyond the single habit.

A case in point is that "source of peculiar ideas," the grandmother. Miss Jones states that "many young mothers take their mother's and grandmother's advice when it comes to questions of feeding the baby." Advice from mothers and grandmothers might not be entirely inappropriate, and a sense of conviction of doing things right may be more valuable than the folk remedy is detrimental. For example, the grandmother may advise that weaning should be accomplished with a certain moon. The guidance may not be harmful, and following it gives the sanction of tradition to the mother's action. Weaning is, of course, an emotionally charged transition and a woman may need to feel the support of her culture and kinsmen. Illness is another crisis in which grandmother's advice may figure. The emotional support gained from using community-sanctioned remedies is probably as important in sustaining the mother's care as medical procedures are in treating the illness.

Furthermore, the actual social ties between generations may be an important resource in the child care system of the community, so that if mother alienates grandmother by taking the nutritionist's advice, mother may make an antagonist out of a helper, to say nothing of the potential entanglement of other family members in the issue. Generational cooperation is an important factor in stability of families in the Negro cultural tradition.

The nutritionist has the difficult job of working in a total situation yet being a specialist. She needs to know about the specific local cultural context of the food practices she may want to change. The practices may be an integral part of a set of values and social habits which themselves are an important source of stability to people and communities. The nutritionist has to ask, Is that practice so detrimental that I should attack it even if weakening one part of the network will tend to weaken the whole, and even if attacking it tarnishes my image as a source of help? Is she certain that the grandmother's advice is detrimental? It seems to me that the nutritionist can afford to look benevolently on the networks of advice emanating from kin and community, especially when low-income groups seem to show ready utilization of child health facilities and high receptivity to professional advice. This seemed to be the case in Sullivan County, Tenn., where Miss Jones reported that 62 mothers sought professional advice, while 50 mothers acknowledged no advice or sought it from friends or relatives, some of whom undoubtedly transmitted the word of professionals.

Dr. Ogden Johnson: By having scheduled a separate session of this workshop to discuss rural low-income groups, we may be making a rural-urban distinction that is more artificial than real. With the exception of the greater transportation problems and differences in availability of certain foods, the rural-urban differentiation would seem to have little substance.

Dr. Philip L. White: What is our working definition of rural?

Dr. Young: The Bureau of Census defines a rural community as one of less than 1,500 persons. Approximately 90 percent of the rural population is nonfarm and includes persons of various cultural backgrounds. It is true that we shall not be able to make many general statements about behavior of rural low-income Americans.

Miss Faustina Solis: I agree that rural low-income Americans are an amorphous group. Even the availability of various foods is not necessarily a distinguishing feature. When a migrant worker has picked a particular fruit all day for a number of days, even the sight of the fruit may cause some nausea. Its availability will not necessarily be a factor in the diet.

Mrs. Kathryn M. Kram: At least some rural populations seem to be distinguished by a greater use of gardens. In these instances the growing and preserving of foods affects the diets of the children.

Miss Barbara Garland: In a survey of 100 families whose female members were receiving services from the Kentucky M&I project in 1968, only 50 percent had gardens of any kind, and these were small, supplementing the diet for just a few weeks each year. The population lacked the necessary knowledge, facilities, and cash for food preservation through canning or freezing. Thus, for many of the rural poor, food production is not a major factor in food procurement.

Miss Catherine Cowell: Preserving food is time-consuming and expensive. I think we are living in a world of fantasy if we imagine that many rural families are growing and canning their food.

Mrs. Margarita Kay: I am presently working in a city of 350,000 people, and within the city limits there is a particular sector where many people have garden plots and some have cows or goats. These people probably grow more of their own food than do people in most rural areas.

Dr. Norge W. Jerome: One-third of the population (150 families, 575 people) that I have studied in Kansas City grow some of their own food and do preserve some of it by canning and freezing. We really do need to look at the environmental influences in specific communities and also at the resources available to people.

Miss Solis: The rural poor as described by Miss Jones resemble in many respects the urban poor. Reduced living space for the poor in the cities has contributed to the development of slums and ghettos, but rural slums prevail in areas where land is thought to be plentiful. The high percentage of crowded, dilapidated, substandard dwellings, coupled with unsafe water supplies creates a hazardous existence for most of the rural poor. The distribution of the population, widely dispersed over large areas without the benefit of public or private transportation, prevents the development of political or social cohesiveness that is often a supportive factor among the urban poor. Mass media have less of an effect on the rural population due to psychologic as well as geographic separatism. Family ties and traditions are held more firmly, sometimes seemingly as a defense to maintain the only values that are totally theirs. Unwillingness to accept the intrusion of the outsider is manifested more openly.

Babies may be given larger amounts of milk than necessary because milk is still considered the "all purpose" food and because it is practical and easy to give. In areas of California where fruits are available, babies may be given juices or bits of fresh fruits as well as cooked soft vegetables. Among Mexican-American farmworkers, mothers try to reduce fruit intake of infants and very young children to decrease the likelihood of diarrhea, which is sometimes quite common during summer months.

Mexican-American families migrating to the west coast may be forced to adapt their feeding practices to the available food supply. Lack of knowledge of their new cultural environment and inability to find traditional foods makes meal planning difficult.

Migrant families, interestingly, seem to exhibit greater adaptability to change, because adjustment to alternatives must be made as quickly as possible by all members of the crew or of the family. Their knowledge of other patterns is broader than that of rural people who never leave their area. There is less fearfulness of experimenting with new foods and new methods of preparation. Food selection then becomes dependent on facilities for storage, refrigeration and cooking equipment. Foods which must be consumed quickly if there is no refrigeration can be expensive. More time must be spent in cooking each meal if there is no storage or refrigeration. Most migrant families supplement their meals with fruits or vegetables that are being harvested but often they tire of these. Meats are not always plentiful, but soups and stews are commonly eaten

because they can be prepared economically and with only one pan. Lighting a fire outdoors for cooking or using a one- or two-plate burner encourages all-in-one meals. Four- to five-month-old babies may be offered meat or vegetables from stews.

Dr. Young: It is a point of great interest that migrant workers, even though they are at the lowest socioeconomic level, are more receptive to nutrition practices of the dominant culture than are people with considerably higher incomes. This suggests weakness of retention of cultural backgrounds.

Mrs. Mary Ellen Wilcox: Our experiences in south Florida are similar in many respects to those reported by Miss Jones. Data collected several years ago indicated that less than 2 percent of 103 infants were being or had been breast-fed. Thirty-five percent received commercially prepared formulas, and most of the remainder (perhaps 60 percent) received evaporated milk formulas. Some of these infants were from urban areas, but little difference was noted in practices of urban and rural mothers. More recently, we have surveyed practices of families, predominantly black, attending health centers in Homestead, South Dade and South Miami. Only six of 116 infants were breast-fed, and most of these were from the rather few Mexican-American families.

The one group of mothers who do appear to be breast feeding a substantial proportion of their babies are the so-called hippies. In Dade County they are mainly concentrated in an urban area known as the artists' colony but others are being seen in clinics serving our semirural areas. Some of these young mothers report using various drugs during their pregnancy and will undoubtedly continue using them during the lactation period. As was pointed out by Arena,[2] the effects of drug usage by the mother upon the breast milk and hence upon the infant are unknown. Some of the mothers are practicing "cult" diets—Yin, Yang, vegan, etc., in some instances nutritionally inadequate for the demands of breast feeding. Although income may be adequate, the commune life style is likely to result in a social and geographic isolation similar to that experienced by low-income groups.

Dr. Mary Murai: A sizable group of individuals in the United States, including the "flower children," have distinctive dietary practices dictated by their philosophy or religion. In many instances, they are well-educated and, as a group, are interested in ecology and problems of pollution. Many are antiestablishment. An increasing number of this group have become adherents to the Zen macrobiotic diet.

This diet was advocated by the late Georges Ohsawa, a Japanese philosopher, who taught that there are two antagonistic but complementary forces in the universe: Yin (expansion) and Yang (contraction). The greatest health and happiness can be achieved by a favorable balance between Yin and Yang. Cereals, notably brown rice, which represent Yang, are at the heart of the macrobiotic diet. They are supplemented by very small amounts of other foods, either Yin or Yang, including vegetables and occasionally fish, meat, dairy products or fruits. Drinking fluids are taken sparingly. These people believe that a child who eats grains and vegetables has a better memory and better understanding than the child who eats mainly meat. His mind is clearer and more agile. His answers in school are more precise. His decisions, in anything he undertakes, are very quick. As the student of macrobiotic philosophy advances in his learning, he may choose progressively more severe diets; at the most extreme he would subsist only on brown rice.

Reports from public health clinics indicate that infants and small children are raised on these diets. Cases of anemia have been found. When children become anemic, parents will not allow iron supplements since it is against the Zen religion.

Mrs. Wilcox: Virtually all indigent women in Dade County deliver at one large county hospital. A well-known proprietary formula is used in the hospital nursery, and a supply of this is given to the mother at the time of discharge. Although the hospital gives out a booklet with instructions for preparing an evaporated milk formula, a pamphlet supplied by the manufacturer of the commercially prepared formula is also given. Many of the mothers are illiterate or barely literate. They confuse the directions for preparation of an evaporated milk formula with those for preparing the proprietary formula. Very young infants are not infrequently fed evaporated milk diluted with an equal volume of water. The stress of the warm climate plus a heavy renal solute load resulting from inappropriate dilution may have serious consequences. Alternatively, 13 ounces of the commercially prepared formula may be mixed with

[2] Arena, J. M.: Contamination of the ideal food. *Nutrition Today.* Vol. 5, No. 4, winter 1970, pp. 2–8.

18 ounces of water and 3 tablespoons of syrup. Finally, the ready-to-use proprietary formula is sometimes confused with that requiring addition of an equal amount of water.

The Jelliffes[3] have pointed out that the unsophisticated new townsman of Jamaica is easy prey to skillful advertising for items he could not afford to buy in sufficient quantity. Some of our isolated rural and semirural poor fit into this category also.

Our observations in Dade County indicate that many infants are not held for feedings, the bottle being "propped" for even very young infants. Homogenized milk not infrequently replaces formula feeding by age 3 months. The reasons commonly given are, "it is easier," "it is more convenient," or, "the homogenized milk is already in the house."

As may be seen from Table 1, infant cereal, often mixed or high-protein, and commercially prepared strained foods are frequently begun by 4 or 5 weeks of age. The cereal may be fed alone or in conjunction with commercially prepared strained fruit. Strained vegetables, vegetables with meat, various "dinners," fruit desserts, custards, puddings and soups are rather commonly used. Many mothers add strained foods to the bottle. Strained meat or egg is seldom fed, although mothers often report feeding meat to a child when, in fact, they are feeding vegetables with meat. Junior foods are infrequently fed.

Table 1.—Feeding of 38 3- to 6-week-old infants in Dade County, Fla.

Age (weeks)	Number of infants receiving various foods			
	Formula	Cereal	Cereal and fruit	Total
3	1			1
4	14	7	3	24
5	2	7	[1] 2	11
6			2	2

[1] One infant also received strained vegetables and meat.

The use of table foods is begun early. Black children 5 months of age are commonly fed grits, mashed potatoes, mashed, cooked dried beans or peas, and rice with gravy.

Some Negro mothers report that they are feeding "pot liquor" from cooked greens as early as 3 months. Sometimes corn bread is crumbled into the "liquor." Unfortunately, regular grits are substituted quite early for the iron-rich baby cereal. Kool-Aid, fruit juices and carbonated drinks are offered from the bottle during the day to children of various ages.

Most black children appear to be fed almost exclusively from the table by 1 year of age. Introduction of solid foods and the use of table foods seems to occur somewhat later in Mexican-American than in Negro families.

Miss Helen Starina: The rural low-income population of Montana is primarily second and third generation Anglo. Most of these low-income families live in or near towns and communities. Although there are rural farm families with a yearly cash income of less than $3,000, many are self-sufficient for food—producing their own meat, vegetables, etc. (These comments are not intended to reflect the practices of the Indians living on reservations.)

Breast feeding is rarely practiced in this area regardless of economic status. We believe that this is related to two factors: First most physicians do not encourage breast feeding or even give much support to mothers who have started breast feeding. Rather, many of them discourage the practice because they feel that it requires too much of their time or because they are concerned about reports of high levels of DDT in human milk. Second, hospitals send home with the mother a supply of proprietary formula with the unspoken implication that this is the "best possible food for the infant."

Initially, infants are fed commercially prepared formula almost exclusively, but by 2 or 3 months of age they are often being fed whole milk. Very little evaporated milk is used.

The belief that a purchased food prepared especially for an infant is the best food available carries over to the use of commercially prepared infant foods. It is common for mothers to boast about the number of jars of strained food consumed at a feeding, as if this were a scale by which to judge development. It is strongly believed that a fat baby is a healthy baby, and some infants have been known to triple birth weight by 6 months.

Most babies are fed cereal at bedtime as soon as they are released from the hospital. By 1 month of age, most are also receiving strained fruits, vegetables, and meats. Infant cereal is usually discontinued by about 6 months. Jello water and Kool-Aid are often used rather than juices. The use of Jello water is based, in part, on the belief that Jello is a good protein source and the fact the baby

[3] Jelliffe, D. B., and Jelliffe, E. F. P.: The urban avalanche and child nutrition. *J. Amer. Diet. Assoc.* 57: 114–118, 1970.

"takes it so good." Table foods are fed in only small amounts until 1 year of age, but there is extensive use of commercially prepared "junior" foods, especially the less expensive dinners and dessert items. Some mothers use undiluted canned soup as a junior food.

Generally by 1½ years of age, the child is expected to eat regular table food with the rest of the family. It is at about this age that excessive intake of milk is often noted—probably because milk is so easy to consume. Although the food available to these families may be limited, we are not aware of any families eating just one food all day or until it is gone.

Miss Garland: Practices in Montana seem to be almost totally different from those in Appalachia, although both groups are primarily second and third generation Anglos.

Miss Starina: The difference may relate largely to the level of poverty. It seems likely that the poverty level in Appalachia is more extreme.

Miss Garland: By all indications the nonwhite population may be the poorest of the poor. However, it is important to remember that most of the poor are white. In the Appalachian area the white to nonwhite ratio among the poor is perhaps 9 to 1. The population consists mainly of rural nonfarming households. In the Appalachian area of North Carolina, approximately 50 percent of all preschool children live in rural households, 10 percent in homes with incomes of less than $3,000 per year. According to reported income, more than 16 percent of the households were eligible for food assistance programs but only 3 percent participated.

In a study of 416 pregnant women in Appalachia, it was found that 28.3 percent had had no protein from meat, fish or poultry on the day of study; 45 percent had had no milk; 79 percent had had no source of vitamin A; and 70 percent had had no source of vitamin C. In 100 families from this same economic stratum, it was found that 27 percent were participating in food programs, while 49 percent were eligible but not participating. Among these families, 55 percent had gardens of some kind; 15 percent depended on relatives, friends, or neighbors for food; 58 percent had no indoor water, and 6 percent had no refrigeration.

Although I not infrequently hear disparaging comments about the high consumption of soda pop by individuals of all age groups among the rural poor, I think this practice is easy to understand when one sees and tastes the water available to many of them.

Dr. Jerome: I think Miss Garland's comment deserves emphasis: most of the poor are white. We are inclined to focus our attention on such subgroups as Indians, Mexican-Americans, Puerto Ricans, and Cubans, and these groups are indeed interesting and important. However, most of the poor are white. They live not only in Montana and Appalachia but in inner-city sections and in rural farm and rural nonfarm areas of most States.

Urban low-income groups

Infant and child feeding practices in an urban community in the north-central region*

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INTRODUCTION

The diet and foodways of a people usually reflect the resources of their physical and social environment. In general, people living in isolated regions or those who have experienced very few meaningful cross-cultural contacts utilize only those food items, food processing techniques, and food consumption methods specific and appropriate to their physical and social environment. Accordingly, as a unit, they manifest a high degree of uniformity in general food consumption as well as in infant feeding practices; this is slightly modified by individual personality factors.

Less uniformity, and greater variety in general food consumption practices are to be expected in human societies experiencing rapid social change generated by scientific and technological developments, industrialization and urbanization. These developments, and their attendant innovations and expansions in areas such as agricultural and food technology, transportation, marketing, communications, and in occupational specialities and work schedules will foster diversities in food use and consumption practices.

The physical and social environment, therefore, serve as strong forces limiting and expanding what items are to be utilized as food, how, where, and when they are to be stored, processed, and consumed and how interpersonal interactions relevant to food use are to be structured. For example, the urban consumer living in an industrialized society like the United States of America has the opportunity to select and consume a wide variety of foods, at various processing stages, from a variety of food service centers, at any hour of day or night. Limitations will be imposed by economic constraints (income, occupation, occupational schedules), sociocultural background (knowledge, belief, and value systems), and most importantly, by personal characteristics (personality characteristics, personal resources, and goals). Three major factors influence the food consumption practices of the American (U.S.A.) urbanite—the dominant culture and economic system, the individual's subcultural background and orientation, and his personal characteristics. Each individual, while utilizing the resources of his immediate and distal environment, will enlarge upon them or modify them in accordance with his frame of reference and life-style. Directly or indirectly, this holds true for the adult, adolescent, child, and infant.

The preceding concept of food use and consumption represents a framework for observing, recording, and describing infant and child feeding practices in an urban community in the north-central region. The focus is on the infant and child; the focal materials are the resources—environmental and personal, immediate and distant.

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METHOD

In an attempt to record and describe the diet and food habits of 150 households (575 residents) of an urban community, anthropological techniques of participant-observation were combined with the more formal sociological method. This combination of methods permitted the collection of data that can only be derived from direct observation and participation in the daily routine of the respondents. It also allowed four fieldworkers to collect and organize data gathered from a fairly large urban population.

Between September 1969 and February 1970, we conducted five sets of preliminary field studies among 42 households in three different urban communities in the Greater Kansas City area. As a result, we refined a food habit research tool developed by the senior author in a previous anthropological study (*1*). The research tool, a structured interview schedule, permitted us to record and structure field observations and informants' responses to 178 questions concerning individual and family food practices.

One hundred and fifty households, a 5 percent random sample of the households in the community described below, participated in a food habits study conducted between March and December 1970.

The structured interview schedule developed for this study was administered to each of the respondent households until all relevant data were collected. An initial contact and an informal visit designed to establish rapport with members of the households were followed by a series of close interactions with families, thus affording us numerous opportunities for observing and recording ongoing events directly and indirectly related to food use. Although we did not reside in the field site, the enthusiastic response and cooperation of the respondents permitted us almost daily contact with each respondent household for the equivalent of 10 days. We interacted as often as was necessary and for as long as was mutually convenient until all data were collected. In many instances, the relationship continued many months after the pertinent data were recorded. Some interviews began as early as 7 a.m. and others ended as late as 11 p.m. on a scheduled or nonscheduled basis, depending upon the type of relationship developed with a particular respondent household. Although we used a structured interview schedule, all interviews were free-flowing and informants were encouraged to follow their own thought patterns and their own organizational format in discussing their dietary practices.

The data comprising the bulk of this paper represent but one small segment of the foodways of the 150 households participating in the study.

THE COMMUNITY

North Central City, located in the heart of two well-defined and locally recognized communities in Kansas City, Kans., is encompassed by three census tracts (*2*). Physically and socially, the area combines what may be termed the best and worst of urban living. One very small area has many of the characteristics of suburbia, another seems almost rural, one strip is said to be the vice district, and most of the area is officially defined as the "inner city."

Many of the services obtained in North Central City are much like those obtained in urban communities of similar age, structure, history and population characteristics. The services are limited in quality and quantity and distinctly inferior to those found in modern neighborhood or community service centers. Residents rely upon mass media and the larger social system for certain basic information and services. However, many services of a social and personal nature may be obtained in the immediate area. Often, these are small outlets of national or regional commercial enterprises and branches of governmental agencies. Individuals and families, depending upon their world view and life space and transportation available to them, must decide whether to rely on North Central City and its adjoining communities for some or all of their consumer services or go elsewhere to obtain them. As far as food is concerned, the local supermarkets provide whatever food items they deem basic merchandise as well as those for which there is significant consumer demand.

Of the two defined communities spanning North Central City, one, community A (approximately two-thirds of North Central City), possesses many of the external characteristics of an "inner city" and is, in fact, the locus of a model cities program. The single-family residential structures which predominate in this particular community vary from good to fair in one section and from poor to those slated for clearance in another. The majority of the population in this community consists of young and middle-aged black adults; the

white minority consists mainly of middle-aged and "retired" adults. The community is served by a number of small shopping strips located primarily along major vehicular routes. These strips usually consist of one or two national chain stores, one or two independent grocery stores, a number of grocery-variety stores, liquor stores, and laundromats. Other businesses include barber and beauty shops, drive-in eateries, food carryout shops, gasoline service stations, and hardware-variety stores. These business places serve as communication centers and informal meeting places for residents and nonresidents alike. However, structured community social activities take place in the numerous Protestant churches located in the community. Educational facilities include one junior high school, 11 elementary schools, and many Head Start and adult job-training centers which are fairly new to the community. Health services in the community include a children and youth project and a few physicians' offices. Well-child clinics are conducted once or twice per week in churches, in other community service centers and in the offices of physicians.

The other third of North Central City is located in community B. The greater part of this community's population is white; the racial/ethnic distribution varies considerably from sector to sector. Although the area has many of the physical and social features of suburbia, due to recent annexations, it is generally considered part of the "inner city." This section contains very few neighborhood stores and has no major shopping areas. Drive-in restaurants, barber shops, beauty shops, and food carryouts are found along the major vehicular routes which are fairly well removed from the residential areas. Educational facilities in the community include nine elementary schools, three junior high schools and one senior high school. Health facilities within the community boundaries are virtually nonexistent; residents must seek health care in other areas of the city.

North Central City is a community in the sense that it is welded by its own social institutions, network of friendships, family ties, mutual obligations and dependence. Many persons refer to three generations of kinsmen who live within walking distance of each other, and a majority of the residents relate to at least one other generation living in close proximity. There is little out-migration in North Central City; most of the single-family dwellings are owned or are being bought by the residents.

OBJECTIVES

This paper represents but one segment of a larger study. It describes infant and child feeding practices from the vantage point of the respondents. It deals mainly with qualitative data, and no attempt will be made to analyze the information collected from respondents or to quantify the foods consumed by the infants and children observed. These will be the subject of subsequent papers.

Guidelines to the organization of this paper have been (a) the social and economic characteristics of the respondents, (b) the acquisition of food, (c) early infant feeding practices, (d) the rhythm and pattern of eating, and (e) feeding practices of children aged 18 to 36 months. Attempts will be made to relate each topic to the physical and social environment of North Central City. This includes the present practices of mothers and women of childbearing age and past practices of women who have passed the period of childbearing. Both types of information are important since older women and grandmothers are influential in infant and child care and feeding in their roles as temporary and permanent babysitters and as advisers to young mothers.

SOCIAL AND ECONOMIC CHARACTERISTICS OF RESPONDENTS

Of the 150 households studied in North Central City, the racial/ethnic distribution was 112 black, 37 white, and 1 Mexican-American. A household is defined as the group which usually inhabits a common domicile and regularly shares its resources to provide food and shelter for its members. Of the 575 individuals in these households, 453 were black, 116 white, and 6 Mexican-American.

One hundred and twenty households consisted of nuclear families. Of the remainder, 17 were lineally extended (i.e., they included persons who were not of the nuclear family but who had lineal kinship to either the male or female head of the household) and 13 were laterally extended (i.e., they included persons who were not of the nuclear family and who either lacked kinship with the male or female head of the household or were more distantly related than in the lineally extended households).

Of the 137 households consisting of more than one individual, 92 were headed by a male and 37

by a female. In eight instances the households consisted of persons not related by blood or marriage. Size of the households is summarized in Table 1, and formal educational attainment of the person interviewed (female in 138 of 150 instances), and spouse is presented in Table 2. Among the 575 individuals included in the study, there were 316 adults or individuals over 16 not attending high school, 180 children 6 to 16 years of age and teenage minors attending school full time, and 79 children less than 6 years of age. Nearly all of the children less than 6 years of age were black.

The labor force status of the 316 adults and individuals over 16 not attending high school was as follows: 209 were employed; 68 were unemployed, retired; and 39 were unemployed, nonretired. The occupational classification of the head of the household (male or female) could be specified for 143 of the 150 households: 43 unskilled workers, 32 skilled manual, 31 semiskilled, 13 lower level professional, 9 sales or clerical, 8 technicians, and 7 managers. (Occupational classifications were derived from Strauss and Nelson (*3*) and professional levels were based on the years needed to complete professional training and the prestige accorded the occupation by American society.)

On the basis of data from the Bureau of Labor Statistics, U.S. Department of Labor, for the Kansas City (Missouri-Kansas) area for spring, 1970, 60 households were below the lower budget cost, 32 were within the lower budget cost, 24 within the intermediate budget cost, and 34 within the higher budget cost. One hundred and twenty-one households owned or held equity in their dwelling; 27 rented and two lived rent-free. Most of the households (143) occupied a single-family house; three lived in a two-family house, two in a three-family house, and two in an apartment building. The dwellings of 85 households had more than six rooms, the dwellings of 63 households had four to six rooms, and the dwellings of two households had one to three rooms. The regional backgrounds of the respondents (usually female) and spouses are presented in Table 3.

ACQUISITION OF FOOD

The supermarket serves as the major locus of food procurement (144 households), although one-third of the respondents supplement their grocery purchases by maintaining small vegetable gardens, by gathering wild greens and mushrooms, by fishing and by hunting small game. These "homegrown" items are considered to be delicacies.

A relatively small number of households (16) participate in the USDA commodity food distribution program. However, through an intricate system of exchange, a majority of the respondents receive and use one or more of the food items generally referred to as "commodity foods." Trips to the supermarket within and outside North Central City for major grocery purchases are spaced according to household needs; however, the trend is either once each week or twice each month (Table 4) coincident with the pay-day cycle. Many respondents volunteered, however, that it is not uncommon to have members of the family pick up bread, milk and lunch meats almost every day at either the supermarket or corner store. In households with small children, approximately 25 percent of a week's food purchases is obtained through this type of supplementary shopping.

EARLY FEEDING OF INFANTS

Data on infant feeding practices were obtained from all women who had had children. This means that information of this type was obtained from more than one woman in extended households (20 percent of sample). The number of women and the total number of children born to them (live births) are shown in Table 5. It is difficult to say whether there is, indeed, a decline in family size in North Central City, since many of the women aged 30 and below are still in the childbearing age.

Infants and children living in North Central City were born in hospitals. Approximately 16 hours after birth, infants are given their first food from the breast or bottle, according to the wishes of the mother. Thereafter, they are fed "on demand" every 3 to 4 hours until they leave the hospital, no later than 3 days after the baby's birth.

Until they are approximately 3 weeks old, infants are fed either entirely by breast or by bottle. Physicians, grandmothers, relatives of the new mother, and older adults within and outside the community are called upon to furnish basic information to the inexperienced mother. Bottle-fed babies receive either milk or formula, depending upon the advice or cluster of advice mothers are offered. At approximately 3 weeks of age, breast-fed babies begin to receive a bottle, and other changes in general feeding practices begin to occur.

Early infant feeding practices are also depicted in Table 5. The table shows shifts in emphasis on breast feeding over the past four decades. A majority of the women beyond the childbearing age had breast-fed almost all of their children, while the opposite holds true for the women who are still bearing children. Women between 31 and 54 years apparently were caught in the transitional period when breast feeding of infants was on the decline. The national trend in the decline in breast feeding has been well-documented in earlier studies (*4*).

Individualism, a cherished American value, aptly describes the trend in the length of breast feeding depicted in Table 6. Regardless of the mother's age group, she uses her autonomy and possibly that of the infant to determine when breast feeding will be terminated. The data indicate, however, that infants born at an earlier period were breast-fed longer than present-day infants.

One-third of the infants of young mothers (age 30 and below) receive food other than milk or formula from approximately 2 weeks of age. By the age of 4 months, approximately all infants (92 percent) have begun to receive additional foods and/or beverages. It is at this time that many mothers substitute milk for formula. The cut-off period for infants born at least a decade ago (those born to mothers over 30) was 6 or 7 months. The data for North Central City are consistent with national trends (*4*). However, as with the length of the breast feeding period, the trend toward individualism in the feeding of infants is demonstrated when milk and formula are supplemented with other foods. (Table 7).

The influence of the sociotechnological environment on the types of foods (other than milk or milk formula) first given to infants is clearly depicted in Table 8. Commercially prepared baby foods and juices are popular among the young mothers (age 30 and below), whose first taste of solid foods was received in the form of crushed "regular table food." Orange juice, other juices, baby cereals, meats and meat dinners, vegetables, fruits and desserts are the most popular items first given to infants of mothers up to age 30, while mothers aged 55 and above served their infants "regular cereal," "regular table food" mashed with gravy, eggs and egg yolks. A combination of these types of food was popular with mothers aged 31–54.

The infant's refusal of food is not taken seriously by mothers; he is coaxed into trying new and different types of commercially prepared foods. However, substitutions are made for those items causing digestive upsets and the offending items are removed from the infant's diet.

While the use of commercially prepared "baby" and "junior" foods is firmly established in current early feeding of infants, and although the timing of the introduction of such foods is also well established, the patterning and style of the menu is often extremely innovative. The abundance and variety of these foods permit choices in selection of food and brand (by parents, friends and relatives), in method of serving, and in blending. Often, that which appears to be a bottle of milk or formula to the casual observer may actually turn out to be milk or formula plus a mixture of two or more commercially prepared baby foods, "baby cereal," or a pureed food such as applesauce. Also, it is not uncommon to observe an infant being served from four or five baby-food jars and a baby bottle at one meal. The liquid from the bottle offered between 2 or 3 spoonfuls of semisolid food helps "wash down" the semisolid mass.

Regular table foods or family fare are given to infants when, in the words of a 20-year-old mother of a 14-week-old infant, "he feels he is ready for it." This is determined "when he starts pulling at the food we (adults) are eating." Another mother of a 16-week-old infant confided, "He ate like he wanted; he pulled it down from my mouth." No particular trend can be identified from the data shown in Table 9 or from on-the-spot observations of mothers with infants. Again, the mother's resourcefulness, autonomy, and her stated ability to sense the needs and wants of the infant determine whether the infant is to be started on "regular table food."

The introduction of regular table food into the infant's dietary does not signal the end of the bottle or the jar. Although "the bottle" serves as the core of the diet, each type of food has its place in the infant's varied and individualized menu and rhythm of eating until he is approximately 18 months old. He is then changed permanently to "regular table food"—often on his own initiative.

THE RHYTHM AND PATTERN OF EATING

The infant establishes his own rhythm of eating at an early age. He gives the signals and those

providing care respond with food. Crying and other indicators of discomfort are usually interpreted as a request for food. The bottle, always within easy reach of an adult, older sibling, visitor, or the infant himself, is given at the more informal feeding times—the equivalent of snack-time in the noninfant world. Early experimenting with "regular table food" and the serving of plain water, Kool-Aid and vitamin supplements also take place at these informal feeding times.

The circumstances surrounding the giving and receiving of food to infants of North Central City are very similar to those of the town in Georgia described by Virginia Young (*5*). "When the baby shows discomfort the mother almost invariably offers the bottle. . . . The feeding is casually interrupted at any sign of decreased demand from the baby and as casually begun again at any interval." The giving of food is to comfort and satisfy; food is not viewed as a symbol of reward or punishment. When the mother or other individuals responsible for the infant's care feel that he is undoubtedly hungry, e.g., after a long nap, when he cries in a certain way, or at the first feeding of the day, a freshly prepared bottle or baby foods are given.

FROM 18 TO 36 MONTHS

Early established rhythmic eating patterns continue during childhood (and presumably adolescence and adulthood). The toddler or young child often initiates the act of eating by either requesting a specific food or by serving himself. One frequently sees a young child help himself to one or more of the many foods (fruits, cereal, cookies, chips, bread, lunch meat) present, or request those not within his reach, e.g., ice cream, milk, popsicle and other ices.

Mothers attempt to fulfill the wishes of their children by selecting during the food quest food items preferred by the children. The focus is on the child or children and the gratification of their food needs and wants. "I always cook what they like" was often heard as mothers described their food consumption practices. One very articulate respondent described very vividly how her children, ages 3 to 7, participated in the weekly grocery shopping planning. Each child was given the opportunity to request one special food each week "so that they would grow up as individuals with a mind of their own." Individualism is sanctioned and encouraged and expressed through food.

For the child of 18 to 36 months, there are three patterned eating schedules. Breakfast is served either at home or at a babysitter's, depending on the family's situation and the occupational schedules of the working adults. As a result, the timing of this meal varies widely. Lunch and dinner as mealtimes are also patterned, but again, with wide variations in spacing due to work schedules and family circumstances. Foods almost always listed as favorites of children within this age group during structured eating times are as follows: canned dinners, spaghetti dinners, fried chicken, mashed potatoes with gravy, green beans, dressing, corn, carrot sticks, variety fruits, bread, cheese, hot and cold cereal, milk, chocolate milk, hot dogs, lunch meats, hamburgers and Vienna sausage. Infants and children of this age are invariably given vitamins every day. Special efforts are made to adhere to this practice during the winter months. The influence of babysitters in fostering and transmitting foodways is recognized by mothers of children within this age range. Often, information on children's likes and dislikes included that reported by the babysitter to the mother.

CONCLUSION

The sample of 150 households in North Central City is approximately 75 percent black and 25 percent white; one Mexican-American family is also included in the sample. The incomes of 61 percent of these families are either below or just within the lower budget cost established by the U.S. Department of Labor; officially, then, these families receive inadequate incomes.

The current national interest in hunger and malnutrition has been translated into programs aimed at many citizens whose lives and living conditions, for the most part, are not too dissimilar from those experienced by a majority of the residents in North Central City. This paper emphasizes the need to view holistically the total patterning of eating within the framework of environmental and personal resources. The ability of the residents of North Central City to use, modify, and enlarge resources from the wider and immediate environment in an effort to achieve satisfaction in eating testifies to the establishment, transmission and maintenance of food habits through environmental inputs and stimuli. Intervention of any kind must take these factors into account.

The data indicate that the food habits of the respondents, especially as they relate to infant and child feeding practices, are consistent with the socioenvironmental and personal forces that determine the selection, consumption, preparation, serving and general use of food. The timing, sequence and frequency of feeding are also part of the continuum established within the social milieu.

Table 1.—Distribution of respondent households by size in North Central City

Household size	Number of households	Household size	Number of households
1	13	8	7
2	42	9	4
3	32	10	1
4	11	11	1
5	18	12	1
6	10		
7	10	Total	150

Table 2.—Formal educational attainment of respondents and spouses

Number of years of formal education	Respondents		Spouses	
	Number	Percent	Number	Percent
1-6	11	7.3	5	5.7
7-9	28	18.7	15	17.2
10-11	23	15.3	21	24.2
12/compl. H.S.	88	58.7	46	52.9
Totals	150	100.0	87	100.0

Note: Since a majority of the respondents are female (138 of 150), the spouses column refers to males, essentially.

Table 3.—Regional background of major informants on food practices

U.S. regions [1]	Respondents [2]	Spouses [2]
North-central	87	70
South	67	32
Northeast	4	1
West	3	
Total	161	103

[1] Refers to area in which individual resided from birth to age 16. Only rarely did an dividual claim more than one region.
[2] Since a majority of the respondents are female (138 of 150), the spouses column efers to males, essentially.

Table 4.—Frequency of major grocery shopping

Frequency	Number of households	Frequency	Number of households
Daily	2	1 time per month	16
2-3 times per week	6	3 times per year	1
1 time per week	91	No set pattern	1
2 times per month	33	Total	150

Table 5.—Early feeding practices of mothers by age groups

Feeding practices	Age group of mothers in years		
	30 and below	31-54	55 and above [1]
Mothers:			
Breast-fed—all children	7	22	26
Breast-fed—some children	6	22	5
Breast-fed—no children	31	15	1
Totals	44	59	32
Children:			
Breast-fed	27(26.2%)	110(45.4%)	93(82.3%)
Bottle-fed	76(73.8%)	131(54.6%)	20(17.7%)
Totals	103	241	113

[1] Except for one or two cases, women beyond childbearing age had no difficulty in recalling their infant feeding practices. The information was obtained when respondents described differences between practices of "modern" mothers and their own.

Table 6.—Average age of infants at end of breast feeding by age group of mothers

Age of infant in months	Age group of mothers in years			
	30 and below	31-54	55 and above	Totals
0- 1.0	8	15	8	31
1.25- 2.0	3	14	1	18
2.25- 3.0	5	15	11	31
3.25- 4.0	1	8	2	11
4.25- 5.0	2	5	3	10
5.25- 6.0	3	23	18	44
6.25- 7.0	1	3	7	11
7.25- 8.0		4	7	11
8.25- 9.0		12	27	39
9.25-10.0		1	4	5
10.25-11.0			1	1
11.25-12.0	4	7	2	13
12.25 up		2	1	3
Don't know			1	1
Not applicable		1		1
Totals	27	110	93	230

Table 7.—Number of infants by age at time of initiation to food other than milk or formula, according to age group of mothers

Age of infant in months	Age group of mothers in years						Totals
	30 and below		31-54		55 and above [1]		
	Number	Percent	Number	Percent	Number	Percent	
0-1.0	32	31.1	52	21.6	2	1.8	86
1.25-2.0	39	37.9	73	30.3	24	21.2	136
2.25-3.0	8	7.8	47	19.5	26	23.0	81
3.25-4.0	16	15.5	30	12.4	12	10.6	58
4.25-5.0	3	3.0	3	1.2	12	10.6	18
5.25-6.0	1	0.9	17	7.1	34	30.1	52
6.25-7.0	2	2.0	18	7.5			20
7.25-8.0	1	0.9			2	1.8	3
8.25-9.0							
9.25-10.0							
10.25-11.0			1	0.4			1
11.25-12.0							
12.25 up							
Don't know					1	0.9	1
Not applicable	1	0.9					1
Totals	103	100.0	241	100.0	113	100.0	457

[1] Those women 55 and above probably would not have had commercially prepared strained foods available for use during their childbearing years.

Table 8.—Number of infants given specific foods at time of initiation to solid foods, according to age group of mothers

Food/beverage served	Age group of mothers in years		
	30 and below	31–54	55 and above
Orange juice	51	129	27
Other juices	30	64	11
Baby cereal	82	110	20
Baby meat/meat dinners	33	44	7
Baby vegetables	33	61	7
Baby fruits/desserts	41	62	9
Egg yolk	16	24	26
Eggs	12	39	27
Regular cooked cereal/milk	8	64	55
Regular table food, mashed	12	79	78
Regular canned fruits, mashed	3	6	22
Fresh fruits, mashed	3	7	2
Don't know		1	
Not applicable	1		

Note: More than one food given to infant when initiated to solid food.

Table 9.—Number of infants by age at time of initiation to "family foods," according to age group of mothers

Age of infant in months	Age group of mothers in years			
	30 and below	31–54	55 and above	Totals
0–1.0	6	13		19
1.25–2.0	7	11	8	26
2.25–3.0	9	23	17	49
3.25–4.0	19	40	16	75
4.25–5.0	7	10	11	28
5.25–6.0	17	68	33	118
6.25–7.0	11	26		37
7.25–8.0	8	5	1	14
8.25–9.0	3	18	1	22
9.25–10.0	5	2		7
10.25–11.0	1	1		2
11.25–12.0	6	10	17	33
12.25 up		1	7	8
Don't know		13	2	15
Not applicable	4			4
Totals	103	241	113	457

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Discussion

Virginia C. Jauch, Session Chairman: I suggest that we now invite questions particularly related to this presentation. We shall then hear from the Valentines, entertain questions about their presentation and, finally, move into a more general discussion.

Dr. Charles A. Valentine: Although 40 percent of the households were found by Dr. Jerome to fall at or below the "low budget cost" level, nearly 25 percent were in the higher budget cost level, suggesting a lot of variation in expendable resources. Could you relate the different levels of available resources to the other reported variables?

Dr. Jerome: Blacks are in a higher budget cost level than whites in this particular community because those whites who could afford to move have moved. Those remaining are retired people with fixed incomes who could not afford to move.

Dr. Charles F. Whitten: I notice the absence of grits as a first food and the absence of greens in the list of favored foods.

Dr. Jerome: We have included grits among cooked cereals. Greens are not favored foods of children in this community. There is a distinct generational difference with respect to consumption of greens and cornbread. These are not favored foods of infants or children and are not forced upon them.

Mrs. Luise K. Addiss: Can you comment on the level of poverty in the families you studied?

Dr. Jerome: There are various ways to define poverty. I felt that the Bureau of Labor Statistics was best able to define it. I realize that people live at various sublevels below the lower budget cost level. I purposely did not use a $3,000 annual income as a cut-off point because I view that as a destitution figure. Many of the families receiving welfare payments would not have qualified for OEO benefits.

Mrs. Addiss: In addition to cultural influences, economics is a potent factor in determining how the mother feeds her baby. How important are these economic factors in interpreting your data?

Dr. Jerome: Most of the people seemed to believe that food was important. They spent what was necessary for food, regardless of the need for strict economy in other areas.

Miss Faustina Solis: I do not believe that is a general pattern. Money for food usually receives relatively low priority in the budget of low-income families. From my own experience in rural and migratory areas, rent is paid first, then utilities and transportation, with the remaining funds being budgeted for food and other expenses. In various ways it is important to know the priority of food in the budget and the consideration of each family member in the use of this food.

Mrs. Addiss: I agree. If you do not pay your rent, you will be evicted. If you do not pay your light and gas bills, services will be discontinued. In many instances, food seems to be the item that gets cut the most.

Dr. Whitten: Did you see a difference in infant-feeding practices related to the time of month?

Dr. Jerome: Yes. Commodity foods, for example, were eaten primarily in times of scarcity. These were the foods resorted to when nothing else was available for the infant to eat.

Dr. Philip L. White: Is the quality of life that you found in this community a reflection of stability worth passing down to the children?

Dr. Jerome: The whole area is quite stable. Many Government programs are tested there because there is little out-migration.

Dr. Samuel J. Fomon: The description of this urban area fits quite well the description of many towns of 500 to 1,000 people. In many respects your description suggests rural nonfarm rather than inner-city urban.

Dr. Whitten: What are your views on the validity of the data relative to age of introduction of solid foods? How do you validate information given by mothers who at age 55 may not have fed an infant for 25 years?

Dr. Jerome: In general, these persons focus on present situations and compare them with those of their own era. I believe this resulted in valid answers.

Dr. Whitten: Recently we asked mothers of 9-month-old infants specific questions concerning

introduction of baby foods. Some of the women had difficulty in recalling age of introduction of various foods. In other studies, detailed information about feeding practices was gathered and 2 or 3 years later the mothers were asked to recall and describe again. There was a discrepancy between the two sets of reports.

Miss Doris Lauber: Accuracy of recall might be related to the number of children the mothers had.

Dr. Marjorie G. Whiting: It would seem that records of food purchases at the checkout counter might provide useful information.

Miss Mary C. Egan: Although in some countries the male is the first fed, children next, and the homemaker last, in our own society this does not seem to be a common pattern. The food purchase approach might therefore yield quite useful information.

Miss Solis: However, in many low-income Mexican-American homes, the mother, whether pregnant or not, will feed the husband and children first. Then, if there is anything left, she will eat. The wage-earner is commonly given first access to available food.

Dr. Jerome: Meals, as such, are frequently not consumed in the traditional way. Food is present in the refrigerator or cupboard, and persons within the household prepare individual meals or snacks when they are hungry. This fostering of individualism must be strongly borne in mind. I believe that records of food purchases may be among the most useful sources of data.

We observed that people purchased food on the basis of what they saw in the grocery store or advertised on TV, suggesting that the supermarket was a great influence. We therefore developed a "supermarket simulator" consisting of a large number of food labels in catalog form. There are four volumes which each interviewer carries to every interview. We begin with a volume of condiments of various kinds and ask whether a specified item is used, when or how it was introduced to the family, whether the entire family eats it, etc. Other volumes concern meats, fruits, vegetables, and cereals. We record all the information by hand during the interview. I found this a good way to get an entire family to discuss their particular likes or dislikes and to elaborate on how certain foods are prepared.

Dr. Whiting: Is it true that families with limited incomes cannot shop for bargains because they cannot afford to experiment with something that may turn out to be unsatisfactory?

Dr. Jerome: I do not believe that question can be categorically answered yes or no. Some low-income families seem willing to experiment.

Dr. Whiting: Do you think they are inclined to shop for standard brands?

Dr. Jerome: Yes. If they are satisfied with a specific product, they are not anxious to accept a substitute.

Poor people, good food, and fat babies: observations on dietary behavior and nutrition among low-income, urban Afro-American infants and children

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INTRODUCTION

It is widely assumed that poor nutrition is closely associated with poverty and with membership in nonwhite minority groups. Inadequate diet, particularly in infancy and childhood, is usually a factor mentioned in the many recent writings on the "cycle of poverty," the "tangle of pathology" found in black ghettos, or the syndrome of "cultural disadvantage." Widespread public attention to the nutritional dimension of poverty has lately been encouraged by congressional investigations and mass media presentations. Most recently, dietary deficiency has been put forward as a major biological cause of behavior by poor people which perpetuates their poverty through mental retardation and school failure (*1*, *2*).

A rather dramatic illustration of this public attention has recently appeared in the form of an article by a Southern Senator in a national magazine under the title "Feeble Bodies, Stunted Minds." Citing the National Nutrition Survey, this author calls special attention to "the effect of hunger upon mental capacity . . . the brain is stunted . . . protein deficiencies before birth and during the first few years of life can cost a child up to 20 percent of his intelligence" (*3*). Meanwhile, spokesmen for the most diverse and even mutually opposed interests are publicly using the supposition that malnutrition causes lasting mental impairment to support their various positions. Thus we find leaders of welfare rights groups and nonwhite minority militants citing this formulation as evidence that society is crippling their children's minds. At the same time, representatives of teachers' unions and education associations cite the same conception to show that they and their institutions are not responsible for educational failure among the poor.

The nutritional problems which have been associated with poverty are generally perceived as embedded in a social context provided by a distinctive life style ascribed to the poor. Here is a typical expert description of the nurturing milieu into which children of poverty are born (*4*).

> The child draws his first breath in a small drafty, sparsely furnished wooden house already overpopulated with children whom no one really wants. His needs will be attended to after a fashion by somebody if he squalls loud and long enough. For a while the somebody will probably be his mother since she is nursing him. When she stops feeding him his care is often relegated to his brothers and sisters, who may or may not take much interest in him. For a while he will have a bottle when he is hungry, and eventually he will find out how to drink out of a cup. It is quite exceptional that anyone will spend much time cuddling him or playing with him or teaching him how to do things. When he is able to get around by himself, he will trail the other children or play alone. During the day they all come and find some food in the house from time to time if they are hungry, while at night they join in whatever the family has for sup-

> per if they like it. No one is much concerned about proper nutrition, or about whether the children eat or not.

Another learned passage shows how this conception of lower-class behavior is made relevant to a particular ethnic group (*5*).

> For instance, a less adequate nutritional level than is found among whites is one factor often cited in accounting for the poorer average health status of Negroes. It is conceivable that Negroes could improve their nutritional status immediately by altering their present patterns of food consumption, but this is likely to occur less as a result of education and propaganda than as a byproduct of changes in the caste-class situation. . . . Maximizing the opportunity for Negroes to achieve the values and norms of the general American middle class is likely to do more to change the eating habits of the Negro population than all of the written or spoken exhortations of home economists or the most seductive television commercials. A shift in social class supplies the motivation to change, and such a shift is dependent upon an increase in the number and proportion of Negroes entering white-collar occupations.

When we turn to works arguing the biological effects of malnutrition working within our society, we find that these generalizations by social scientists have been assimilated by medical and other specialists on nutrition. Thus early in his book Hurley (*1*) gives extensive attention to the "self-perpetuating" nature of the "culture of poverty." Most of this volume is devoted to the thesis that there are various causal relationships—including nutritional ones—between poverty and mental retardation. Toward the end of his exposition he goes so far as to argue that "a ghetto child usually suffers some, if not all, of the ill effects of malnutrition simultaneously and synergistically." Similarly, Birch and Gussow (*2*) reinvoke the social science conception of poverty as "a way of life" to conclude their demonstration that poverty is perpetuated by malnutrition and poor health leading to school failure and unemployment.

The dietary and nutritional evidence cited in such studies has generally been produced by one of two research methods. In the one approach, interviews and questionnaires are used to elicit from children or parents a picture of diet in terms of reported food intake. The other type of method involves clinical assessment of medical conditions which are assumed to have nutritional causes. Both these methods are somewhat indirect approaches to the facts of dietary behavior. The interviewer or collector of questionnaires is considerably removed from the day-to-day realities of infant and child feeding in people's homes. His method allows the possibility of considerable misunderstanding, omission, or distortion of information. Clinical evaluation of sample populations can, of course, identify the distribution of significant biomedical conditions. Yet the presence of clinical signs and symptoms does not in itself necessarily establish etiology, whether the suspected causes be nutritional or otherwise.

While the weakness of either approach by itself may be admitted, there seems to be an implicit assumption in the literature that when the two methods produce consistent results they are mutually confirming. There may be little reason to question this logic in investigations which extensively document very extreme denial of basic material needs (e.g., see refs. *6–9*). In these instances the material conditions of existence appear to establish a persuasive case.

Yet major published discussions show a strong tendency to generalize and to encompass "the poor" as a totality in the same analysis. As one recent source puts it, "It will be taken for granted that the poor get less or lower quality food than the other classes." The context of this quotation makes it clear that the deficiencies the author has in mind are such as to cause severe and permanent organic damage (*1*). This kind of generalization rests on a conception of "the poor" as a unitary category with uniform characteristics. This conception is again supported by the theoretical notion of a "culture of poverty" which, as we have seen, also has an important place in this same literature. Thus the arguments of Birch, Hurley, et al.—that poverty is significantly perpetuated by unhealthy dietary behavior—appear to be extended through several levels of abstraction rather far beyond available empirical evidence.

In particular, these enthusiasts have ignored the more sober scientific evaluations of the problems at issue. One careful review of "the supposition that malnutrition causes permanent mental retardation" recently concluded that "there is little conclusive scientific evidence to support such a supposition." The same source warned that "surmises should not be treated as facts and millions of malnourished children should not be condemned as permanently retarded mentally" (*10*). While we as cultural anthropologists can contribute little to resolving the biomedical issues involved here, we

do happen to be in a good position to collect evidence on the behavioral dimensions of this problem area.

With these considerations in mind, we have carried out the research described in this paper. A major purpose of this work is to provide a kind of evidence that has not, to our knowledge, previously been used to test hypotheses about relationships between nutrition and poverty. Our aim is to develop direct observational data on the actual eating patterns among the infants and young children of a poor population. We shall then discuss the implications of this evidence both for the nutritional conclusions cited earlier and for the social and cultural interpretations associated with them.

METHODS AND DATA

This research is part of a larger project, an anthropological study of low-income urban Afro-Americans. This wider study is designed to define the social structure and cultural patterns of an inner-city community in order to test several hypotheses about the sources and perpetuation of Afro-American inequality. Since mid-1968 we have been carrying out this work in a poverty-stricken district of a major northeastern city which, for reasons of confidentiality, we refer to by the pseudonym Blackston. (*11*).

The principal method of gathering data in this research is the anthropological technique of participant observation. The key to this approach is that throughout the fieldwork—which we expect to extend over 5 years—we and our young son live in Blackston and immerse our lives in the social processes of the community. Our basic sources of information are direct observation of ongoing social behavior, together with participatory experience of the prevailing conditions of existence in the community under study. We do not employ questionnaires or other formal interview techniques. We do get to know a great many people very well and are able to elicit through informal verbal interaction much information not accessible to observation or participatory investigation.

In part of our overall research design dealing with domestic and family patterns, we have chosen a representative sample of over 100 households for especially intensive study. Over the past 2½ years we have made a great many observations and collected much detailed information on these domestic units. This part of the work has given us extensive general knowledge of the cooking, eating, and child care patterns that are typical of Afro-Americans in Blackston. Throughout most of this work, however, our investigation was not primarily focused on dietary behavior as such. Our broader domestic inquiries thus provide a context and background for a more intensive and systematic study of diet in a smaller sample population.

During the latter part of 1970 we chose a subsample of youngsters and households which we believe is representative of families with young children among the Afro-American majority of the community. Relevant characteristics of these individuals and their domestic situations are summarized in Table 1. (There, as in the other tabulations, individual subjects are arranged by age from infant A, 3 months, to child S, 30 months.) This subsample consists of 20 children living in 15 distinct domestic units. Subjects B–1 and B–2 are twins whose elder brother L also lives in the same house. Other closely related children residing together are A and S, D and Q, G and N. All but three of the sample households also included older children whose diets were not under study at this time.

Of the youngsters whose eating behavior was studied intensively, half (10) were infants less than 1 year old, while the other half were children between 1 and 3 years. About three-quarters (16) of the total are females. All members of the 15 households are Afro-Americans. In most cases, the parents of the children observed were born and brought up in the northern, urban United States, while more of the grandparents were from Southern States. All children and parents were free of any known serious illness at the time of observation. Three children (A, G, N) were suffering from colds, and one of these three (G) had been diagnosed as anemic on the day preceding observation.

All but two of the households studied receive financial support from Aid to Families With Dependent Children. In Blackston this means an average annual income for a family of four amounting to approximately $3,000. This can be compared with a national poverty level of $3,555 for a family of four. It should also be noted that the Bureau of Labor Statistics has recently established the following four-person family incomes as required for various standards of living in the metropolitan area in which Blackston is located: $12,134 for a "moderate" level, $7,183 for a "lower" level. While Blackston incomes do not reach the

depths of extreme destitution to be found in some areas, there can be no doubt that the families in our subsample are poor.

During late 1970 and early 1971, approximately 250 hours were spent in direct observation and recording of food intake and associated behavior of these children, their parents, and other family members in their natural domestic settings. This included at least 1 full day from waking to sleeping for each infant and child. Everything eaten was carefully measured or estimated as to quantity. In all cases of commercially packaged and prepared items, designated nutritive constituents were noted. All these observations were carried out by the senior author of this paper. Because the households observed are very well known to us, because we took care not to interfere with existing feeding practices, and because in many cases the observer was not expected before she arrived, we are confident that these observations produced a valid record of undisturbed customary behavior.

Two additional procedures rounded out the data-gathering phase of this project. Many hours were consumed with the adults of each household recording the dietary histories summarized in Table 2, collecting parental impressions of the children's eating habits, and eliciting expressions of beliefs and values connected with related aspects of child care and child rearing. Observations were carried out in five local food markets to determine the cost and availability of common dietary items.

The quantitative data from observations of food intake of each child in the study were analyzed. Food energy, protein content, and iron content were assumed to be the most important nutritional values for assessing the food eaten. These values were calculated for each item ingested. The principal sources used in computing the nutritional composition of foods were Church and Church (*12*) and Beech-Nut (*13*). Supplementary sources also used for this purpose included Cooper et al. (*14*) and, wherever possible, U.S.D.A. (*15*). The total food values consumed in a day were then calculated for each subject, and this total was compared with Recommended Dietary Allowances and, where applicable, with minimum daily requirements for the relevant ages. The standards for these comparisons were taken from publications of the Food and Nutrition Board (*16*) and the Journal of the American Dietetic Association (*17*). Where the body weight of infants is required to compute dietary requirements, this was obtained with a standard balance scale. The results of these computations and comparisons are summarized in Table 3, with the detailed data presented in Table 4.

A number of findings can be derived from the evidence which has been tabulated. From Table 1 it can be seen that the birth weight of all individuals in the sample was within the normal range, and the weight gain of infants in the first year was within the limits of healthy growth (cf. Spock, *18*). (Although the present weight of the older children in the sample was not measured, none of them appears to be seriously under- or over-weight.)

The dietary histories presented in Table 2 show a number of regularities. Although more than a third of the subjects began life with scheduled feedings established by the hospitals where they were born, 80 percent were soon following the pattern of demand feeding which is the choice of most mothers in this community. Most newborns are started on commercially prepared formulas by the hospitals. (Breast feeding is neither encouraged by health institutions nor approved by the mothers.) Babies are switched to evaporated or whole milk quite early because these are less expensive and because mothers tend to regard prepared formulas as appropriate only for very young infants and children who are unhealthy or not growing well. Introduction of solid food generally begins with cereals added to the milk or formula. Addition of this and other solids to the diet regularly occurs substantially earlier than conventional authorities appear to expect (*14*, *18*, *19*). Vitamin supplements are generally recommended by hospitals and clinics, and they are regularly given to nearly all infants and younger children in the sample.

The picture that emerges from the daily food intake recorded in Tables 3 and 4 is somewhat more variable. Approximately three-fifths of the sample were observed to achieve caloric intakes equal to or above the recommended daily allowances. Only four of the 20 youngsters fell 30 percent below this level, two of them being ill and on medication for colds; another four were 10–20 percent below the recommended level. All individuals but one exceeded the recommended intake of protein; indeed 13 out of 20 consumed double the daily recommended level in this category. In iron consumption few youngsters came up to the recommended daily allowance (two infants and two children). On the other hand, one-third of

the infants and 80 percent of the children exceeded the minimum daily iron requirement. It should be noted that in cases of generally low consumption, such as child O, mothers volunteered that their chidren normally consumed more than they did on the days when their intake was measured, and our own observations tend to bear this out.

Several considerations seem to be relevant to the apparently low intake of iron among these children. The principal sources of iron in these diets are cereals and meats. Cereals enter the diet, however, chiefly as the earliest supplement to milk and tend to be dropped as the infant grows into childhood. Mothers regard cereal as functioning chiefly to make the early milk diet more robust and filling. Meats, particularly during the earliest months before table foods begin to be consumed, are introduced only in mixed prepared forms containing little iron. No infant or child was observed eating strained or junior meats and no mother reported using these. Instead, parents give their youngsters the mixed baby food "dinners," both because they are less expensive than unmixed meats and because people value the combinations of vegetables, starches, and other items as "more complete." (At the same time, it should be noted that current iron requirements for young children have recently been revised and appear to be still a matter of some controversy among nutritionists (*20*).)

Some more qualitative matters, not directly reflected in the tabulated data, deserve brief attention. In Blackston, mothers, grandmothers, and other older family members are very concerned and involved in the care and feeding of youngsters. Babies are rarely left to cry for food or children to fend for themselves when hungry. It is generally believed that the young should eat as much as they want. Despite scant financial resources, budgeting and sharing are practiced so that children's wants are seldom frustrated. Parents pay close attention to the health of their offspring and take pride in their growth and development. Rapid maturation in eating habits is valued as a sign of healthy growth.

The ruling criterion in these matters among Blackston Afro-Americans is the standard of the "fat baby." There is no greater approbation or source of familial pride for parents and grandparents than to be known for having one or more fat babies. The adjective generally denotes robustness or plumpness rather than obesity, with a definite connotation of being well fed and generally well cared for. Parents and offspring have little contact with nutritionists—most exceptions being the result of referrals by clinics and hospitals—but when such contacts do occur, they frequently result in conflict on this standard of child health. Nutritionists tend to regard this as a misleading criterion of health. The nutritionist in a local health institution reports that the most common nutritional problem she sees is obesity, which she associates with over-eating and excessive dominance of milk in children's diets. (The next most frequent relevant disorder, though considerably less common, is said to be anemia; no incidence figures are available either for these problems or for pica.) Except for cases of obesity sufficiently extreme to impress a layman's eye, which are rare in our experience, parents generally do not accept this position of the nutritionist.

Mothers generally attend well-baby clinics quite regularly. They are aware of two main themes of nutritional advice from these institutions, one of which they understand and accept, while the other is not meaningful to them. Prescriptions of vitamins and similar dietary supplements are welcomed. Suggestions that solid foods are being introduced too early, on the other hand, are generally rejected as being without convincing rationale.

RESEARCH CONCLUSIONS

The research described here has certain limitations which may restrict the generalizability of any conclusions to be drawn from it. Our sample of systematically observed subjects is small. The number of quantitative observations so far carried out is likewise limited. The nutritional analysis of our data can perhaps be more definitively interpreted by specialists in the health sciences than by us as cultural anthropologists.

Nevertheless, the available evidence points to some suggestive interpretations. There is no doubt that the Afro-Americans of Blackston live in a condition of severe socioeconomic inequality and thoroughgoing poverty. Yet it does not appear that their infants and young children suffer from extensive or extreme malnutrition. In major respects the diets of Blackston youngsters appear to be fairly adequate as to quantity, quality, and variety. Giving a high priority to the health and growth of their younger members evidently en-

ables most families to maintain reasonable nutritional levels in spite of inadequate resources.

Our findings are inconsistent with much that has been written about the "culture of poverty" which is supposed to determine not only dietary habits and child care patterns, but so much else in the social behavior of poor people. In particular, we find nothing to support such supposedly specific characteristics of nutrition among the poor as "only milk diets," rejection of solid foods for infants, or resistance to prescribed nutritional supplementation (*2*). In more general terms, the quality of feeding and care of children in Blackston bears no resemblance to the portrayal quoted from Stone et al. in the opening section of this paper. Similarly, our evidence gives no support to the cited view of Drake that Afro-Americans must first become middle class to achieve an adequate nutritional level.

These findings further suggest that generalizations about relationships between poverty and nutrition based on questionnaires and clinical data alone must be questioned. Indeed such hypotheses should be regarded as undemonstrated until much further direct evidence as to actual dietary behavior among poor people can be brought to bear on these theoretical questions. Meanwhile it is highly dubious to conclude that maladaptive nutritional habits of the poor are a major factor in perpetuating the general phenomenon of poverty. Our evidence indicates, rather, that the major forces responsible for maintaining socioeconomic inequality should be sought outside the nutritional process.

GENERAL CONCLUSIONS

The stated purpose of this workshop has been "cataloguing the known practices and customs of various low-income groups within the United States" (*21*). Each paper and each set of prepared comments has contributed information toward this goal. We would like to offer some generalizations which we think can be derived from this information. These generalizations can be considered as our discussions proceed, with an eye toward formulating some conclusions at the end of the workshop.

Most of the groups of poor people reported here appear to succeed remarkably well in providing their infants and young children with diets that prevent major severe nutritional deficiencies. This is certainly no cause for complacency. Greater attention to extremely deprived groups—such as migrant workers—might well have revealed more severe problems. Nevertheless, the evidence as it stands is impressive testimony to the determination and ability of poor people to insure the survival of their offspring.

Ethnic differences, in the sense of contrasting cultural traditions, seem to produce only minor differences in diet at this age level. Afro-Americans and poor whites of southern origin appear to share a regional dietary pattern in this respect (cf. Jones, p. 37; Jerome et al., p. 49). Chicano and Latino traditions about "hot" and "cold" foods evidently have minor or ambiguous significance for the diets of the very young (see Acosta and Aranda, p. 75). Such culturally exotic items as Hawaiian *poi* (Brown and Ho, p. 91) or Eskimo and native American wild foods (Peterson, p. 101) do not seem to be the major determinants of nutritional status.

The so-called culture of poverty—with its emphasis on ignorance, disorganization, and inability to cope—bulks large in the expectations of experts, but it receives little support from the actual evidence reported here. This point is most explicitly supported by the material from Blackston and from North Central City (Jerome et al.). However, the same conclusion seems to us to be implied by the other papers as well.

The deficiencies and problems which do recur from one group to another are most clearly related to the stark material conditions of poverty. Thus Owen et al. have found essentially the same limited supply of vitamins and minerals in the diets of poor Mississippians (*22*) and Apache Indians (*23*). In a more specific example, the economically determined dependence on commercially prepared strained dinners occurs over and over from Florida to Alaska. The chief limiting factors regularly appear to be insufficient financial resources and economically determined unavailability of nutritious foods.

In discovering the facts of low-income dietary behavior, there is no adequate substitute for direct observation and intimate experience of the conditions of life. Interview questionnaires and clinical visits alike produce results which are ambiguous and difficult to interpret. The contrasting and sometimes confusing expert opinions as to the significance of "hot" and "cold" food categories in Spanish-American diets are a case in point. In

another kind of example, Afro-American mothers in Blackston consistently overstated the amount of milk actually consumed by their offspring, apparently reflecting the widespread belief that milk is authoritatively recommended as *the* food for the very young. We suggest that generalizations in the literature about "all milk diets" may be largely due to respondents believing that this is what interviewers regard as an approved response. Similar factors are probably at work in other instances where questionnaire evidence conflicts with data from observation.

We should perhaps remind ourselves that providing nutrients to infants and young children is an aspect of social behavior that is rather immediately rooted in basic material, biological, and human needs. Here we are evidently dealing with an elementary panhuman capacity for survival which, in its essentials, is relatively little influenced by differing cultural styles, standards, values, and the like. We have impressive evidence that the most diverse and even very poor human groups maintain reasonably adequate feeding practices. Moreover this is done largely without benefit of specialized nutritional knowledge or expert dietary education.

The major failures and unresolved problems lie rather in the socioeconomic system which distributes necessary material resources. We therefore suggest that this workshop consider a reordering of priorities for those concerned professionally with infant and child nutrition. Specifically, we propose that cataloguing, evaluating, and influencing the indigenous or traditional feeding patterns of poor people be reassigned to a secondary priority. The primary application of nutritional expertise should rather be to interrelations between diet and the larger socioeconomic system. In particular, nutritionists should study and act upon the dietary effects of commercial institutions, governmental food policies, and the economic position of the poor and minorities.

It is, of course, not difficult to think of many specifics within these broad problem areas. More vigorous efforts are obviously needed to insure that effective requirements are imposed on food manufacturers with respect to enrichment procedures, including iron supplementation. It seems self-evident that a national Government that spent "$36 billion in farm subsidies in less than a decade to rid itself of the effects of abundance" (*3*) must do better than the current annual rate of little more than $1 billion expended on food stamp programs, plus the other equally minimal forms of nutritional assistance now available to the poor. Equally open to question are the policies of State governments which reduce welfare benefits every year or two. For example, in New York, in the spring of 1971 the legislature cut the assistance received by over one and a quarter million persons to a level 10 percent below the federally certified need, provoking a few specialists in pediatrics and nutrition to forecast "weaker diets" and "mandated malnutrition" (New York Times, 29 April 1971).

Beyond such specifics we must begin to deal with somewhat more basic issues. We must acknowledge the fact that some of the most nutritionally deprived groups in our population are the dispossessed heirs to the soil itself—native Americans—as well as many of the people whose labor coaxes such an abundance of produce from the same ground—migrant farm workers, sharecroppers, and tenant farmers. Ultimately all of us who claim a knowledgeable interest in the basic problems of human sustenance must face the implication that the social system which manages the allocation and distribution of the necessary material resources is fundamentally unjust. To understand and to change this system—not the feeding customs of the poor—should be our priority concern.

Table 1.—Personal and social characteristics of individuals observed

Subject	Sex	Birth weight		Present weight		Present age (in months)	Resides with		Regional origin	
		(lbs.)	(ozs.)	(lbs.)	(ozs.)		Parents	Grandparents	Parents	Grandparents
A	F	8	8	15	10	3	X	X	North	South
B–1	F	5	12	11	10	4	X		North	North
B–2	F	6	8	13	13½	4	X		North	North
C	F	6	10	13	12½	4	X		North	South
D	F	8	9	15	10½	6	X		North	South
E	F	5	1½	19	10	8	X		Honduras	Honduras
F	M	8	2	21	9½	8	X		North	North
G	M	5	11	21	13	9	X	X	North	South
H	M	7	0	23	5	10	X		North	North
I	F	6	0	21	3½	11	X	X	South	North
J	F	6	7			14	X		North	North
K	F	7	8			15	X		South	South
L	M	9	4			19	X		North	North
M	F	8	13			20	X		South	South
N	F	6	9			20	X	X	North	South
O	F	6	13½			20	X		South	South
P	F	7	10			23		X	North	South
Q	F	9	15			25	X		North	South
R	F	5	7			26	X		South	South
S	F	9	10			30	X		South	South

Table 2.—Dietary histories of individuals observed

Subject	Demand or schedule feeding	Milk or formula		Age at change
		Initial	Present	
A	Schedule	Carnation 1:1:2T [1]	Homogenized milk	3 months
B–1	Demand	Carnation 1:1:2T	Carnation 1:1:2T	Undetermined
B–2	Demand	Carnation 1:1:2T	Carnation 1:1:2T	Undetermined
C	Schedule-demand	SMA formula	Homogenized milk	1 month
D	Schedule	Carnation 1:1:2T	Homogenized milk	3 months
E	Schedule-demand	Similac	Similac-Iron	3 months
F	Schedule	Carnation 1:1:1T	Homogenized milk	3 months
G	Demand	Similac	Carnation 3:5	6 months
H	Schedule-demand	Similac	Carnation 1:1:2T	5 months
I	Demand	Similac	Homogenized milk	4 months
J	Schedule-demand	Similac	Homogenized milk	4 months
K	Demand	Enfamil	Carnation 1:1:2T	1½ months
L	Demand	Enfamil	Carnation 1:1:2T	3 weeks
M	Schedule	Enfamil	Homogenized milk	6 months
N	Demand	Similac-Iron	Homogenized milk	4 months
O	Demand	Enfamil	Carnation 1:1:2T	6 months
P	Demand	Carnation 1:1:2T	Homogenized milk	7 months
Q	Demand	Similac	Carnation 4:6:1T	1 month
R	Demand	Enfamil	Homogenized milk	4 months
S	Demand	Similac	Homogenized milk	3 months

[1] Carnation formula reported in terms of the milk-to-water ratio and the added sugar or syrup.

Table 2.—Dietary histories of individuals observed—Continued

Subject	Age (in weeks) at addition to diet				Vitamins	
	Cereal	Fruit	Meat and vegetables	Table food	Ever taken	Presently taken
A	4	4	4		Polyvisol	Polyvisol
B–1	1	4	4		Trivisol	Trivisol
B–2	1	4	4		Trivisol	Trivisol
C	1	3	8		Polyvisol	Polyvisol
D	6	8	8		Trivisol	Trivisol
E	6	6	6		Trivisol	Trivisol
F	1	4	8		Trivisol	Until 3 months
G	4	6	6	6	Trivisol	Trivisol and Ferinsol
H	2	2	5		Trivisol	Polyvisol
I	1	1	8	16	Polyvisol	Polyvisol
J	1	1	8	28	Polyvisol	Polyvisol
K	1	4	4	32	Trivisol	Until 6 months
L	1	4	4	12	Trivisol	Polyvisol
M	1	1	1	30	Vipenta	1-A-Day
N	1	1	8	16	Trivisol	Trivisol
O	1	4	4	6	Vipenta	Until 18 months
P	8	16	16	20	Polyvisol	Until 13 months
Q	8	12	12	32	Polyvisol	Polyvisol
R	1	8	8	8	Polyvisol	Until 15 months
S	4	4	4	24	Polyvisol	Polyvisol

Table 3.—Comparisons of daily food intakes and Recommended Dietary Allowances

Subject	Food energy (kcal.)		Protein (gm.)		Iron (mg.)	
	Observed	RDA	Observed	RDA	Observed	RDA
A	736	770	26.43	14.00	15.32	10
B–1	1,058	600	40.73	11.00	3.96	10
B–2	952	660	35.85	12.00	3.40	10
C	950	660	26.52	12.00	3.72	10
D	664	770	22.14	14.00	17.14	15
E	918	800	20.44	14.40	12.74	15
F	743	1,000	28.58	18.00	3.13	15
G	739	1,000	29.51	18.00	1.80	15
H	1,213	1,000	49.12	18.00	2.76	15
I	832	1,000	36.86	18.00	6.53	15
J	1,094	1,100	51.36	25.00	7.91	[1] 15
K	1,222	1,100	59.89	25.00	10.02	15
L	1,442	1,100	60.01	25.00	9.07	15
M	1,806	1,100	91.77	25.00	15.66	15
N	1,412	1,100	62.02	25.00	7.46	15
O	373	1,100	14.18	25.00	.55	15
P	1,254	1,100	50.75	25.00	7.11	15
Q	1,545	1,250	81.55	25.00	17.33	15
R	1,373	1,250	63.54	25.00	7.85	15
S	983	1,250	36.94	25.00	5.48	15

[1] Minimum daily requirement for infants more than 1 year of age is 7.5 mg.

Table 4.—Detailed 1-day food intake of individuals observed

Subject	Food energy	Protein	Iron
	(kcal.)	(gm.)	(mg.)
A			
17 oz. Carnation formula (1:1:2T sugar)	429	18.70	0.28
4½ oz. Beech-Nut macaroni (strained)	94	3.12	.55
4¾ oz. Beech-Nut applesauce (strained)	108	.13	.51
⅓ cup Beech-Nut mixed cereal (dry)	105	4.48	14.00
	736	26.43	15.32

See footnotes at end of table.

Table 4.—Detailed 1-day food intake of individuals observed—Continued

Subject	Food energy	Protein	Iron
	(kcal.)	(gm.)	(mg.)
B–1			
32 oz. Carnation formula (1:1:2T Karo)	834	35.20	2.56
6¾ oz. Beech-Nut cereal, egg yolks and bacon	177	5.24	1.19
2 t Beech-Nut vegetable soup (strained)	4	.11	.04
2⅔ oz. Beech-Nut pears (strained)	43	.18	.17
	1,058	40.73	3.96
B–2			
30 oz. Carnation formula (1:1:2T Karo)	782	33.00	2.40
2¼ oz. Beech-Nut cereal, egg yolks and bacon	59	1.75	.40
2¼ oz. Beech-Nut vegetable soup (strained)	25	.74	.26
4¾ oz. Beech-Nut pears (strained)	86	.36	.34
	952	35.85	3.40
C			
18 oz. homogenized milk	362	20.25	.23
4½ oz. Beech-Nut turkey and rice with vegetables	59	1.75	.37
4¾ oz. Beech-Nut apple betty (strained)	156	.43	.32
4 oz. Beech-Nut mixed fruit juice (strained)	69	.26	.79
1 cup cooked Farina	140	3.80	2.00
2 t butter	72	.03	
2 T sugar	92		.01
	950	26.52	3.72
D			
9 oz. homogenized milk	181	10.13	.11
7¾ oz. Beech-Nut creamed cottage cheese with pineapple (junior)	184	6.07	1.42
2⅔ ozi Beech-Nut apricots (strained)	56	.19	.25
8 oz. Beech-Nut orange juice (strained)	135	1.13	1.36
⅓ cup Beech-Nut oatmeal cereal (dry)	108	4.62	14.00
	664	22.14	17.14
E			
1 ginger snap	17	.20	.10
24 oz. Similac with Iron	480	12.25	8.57
3¾ oz. Beech-Nut vegetables and liver with rice and barley (junior)	44	2.88	1.67
3⅞ oz. Beech-Nut sweetpotatoes (junior)	72	.77	.39
⅓ cup mashed potato and collards	62	2.50	.57

Table 4.—Detailed 1-day food intake of individuals observed—Continued

Subject	Food energy	Protein	Iron
	(kcal.)	(gm.)	(mg.)
3 oz. Beech-Nut bananas (strained)	77	.26	.26
4¾ oz. Beech-Nut peaches (strained)	112	.98	1.01
3 Nabisco vanilla wafers	54	.60	.04
	918	20.44	12.74
F			
16 oz. homogenized milk	322	18.00	.20
4½ oz. Beech-Nut vegetables and lamb with rice and barley (strained)	69	2.66	.47
4½ oz. Beech-Nut chicken noodle dinner (strained)	53	1.98	.56
4½ oz. Beech-Nut chicken soup (strained)	54	2.35	.35
2¼ oz. Beech-Nut garden vegetables (strained)	27	1.52	.39
4½ oz. Beech-Nut squash in butter sauce	54	.90	1.64
4¾ oz. Beech-Nut applesauce and cranberries (strained)	127	.27	.40
½ Seabiscuit cracker	37	.90	.12
	743	28.58	3.13
G			
24 oz. Carnation formula (3:5)	423	21.50	.30
3 t scrambled egg	56	3.65	.55
5 T potato mashed in beef gravy*	65	1.90	.50
3 t applesauce	45	.10	.25
2 saltine crackers	28	.58	--
2 Oreo cookies	80	1.18	--
1 solid chocolate egg (marble size)	42	.60	.20
	739	29.51	1.80
H			
29 oz. homogenized milk	583	32.63	.36
5 oz. Gerber's lasagne dinner with sauce and ham** (junior)	86	3.70	.70
1 cup mashed potatoes	188	4.20	.80
½ cup frozen broccoli	26	2.90	.70
7¾ oz. Beech-Nut peach melba (junior)#	204	3.50	.20
3 soda crackers	90	2.19	--
1 t butter	36	--	--
	1,213	49.12	2.76
I			
13 oz. homogenized milk	262	14.63	.16
4½ oz. Gerber's vegetables and beef (strained)	80	3.30	1.36
1 t peanut butter	38	1.70	.13
2 oz. pork roast	116	12.20	1.80
¼ cup collards mashed with potato	31	1.25	.35
4 t Beech-Nut mixed cereal with fruit	43	.62	.90
4¾ oz. Beech-Nut applesauce (strained)	108	.13	.51
4½ oz. Gerber's orange juice	71	.60	.72
1 arrowroot cookie	21	.43	--
1 slice enriched white bread	62	2.00	.60
	832	36.86	6.53
J			
24 oz. homogenized milk	483	27.00	.30
1 fried chicken wing	54	6.85	.55
Stew beef (approx. 1 inch square)	73	9.18	1.40
1 cup Cheerios	102	3.40	1.10
1½ T fried potatoes and onions	46	.68	.18
¼ cup peas and carrots	24	1.05	.58
½ cup boiled potato with beef gravy*	65	1.90	.50
4 Dipsy Doodle chips	50	n.a.	n.a.
4 marshmallows	100	.80	--
2 t sugar	30	--	--
1 T Bosco	49	.50	3.30
½ t margarine	18	--	--
	1,094	51.36	7.91

See footnotes at end of table.

Table 4.—Detailed 1-day food intake of individuals observed—Continued

Subject	Food energy	Protein	Iron
	(kcal.)	(gm.)	(mg.)
K			
26 oz. homogenized milk	523	29.25	.33
1 slice spiced ham lunch meat	81	4.60	.40
1 fried chicken wing	54	6.85	.55
½ cup soup—made with—			
2 lb. 1 oz. can tomatoes			
1 lb. 1 oz. can okra			
1 lb. 1 oz. can corn			
2 cups cooked rice	43	1.57	.53
1 slice enriched white bread	62	2.00	.60
½ commercial waffle (enriched)	104	3.50	.65
1¼ cup spaghetti in tomato sauce	179	7.00	2.40
½ cup Beech-Nut oatmeal cereal (dry)	108	4.62	14.00
1 t imitation maple syrup	19	--	.26
1 T Bosco	49	.50	3.30
	1,222	59.89	10.02
L			
1½ cup cooked spaghetti	249	7.65	2.10
22 oz. milk (Carnation skim dry mix)	242	24.20	--
2½ oz. meat (government surplus)##	208	9.88	.87
1½ scrambled eggs	168	10.90	1.65
1 cup cooked canned tomatoes	52	2.60	1.20
1½ cups applesauce	364	.80	2.00
½ fresh cooked onion	15	.60	.20
¾ cup Cream of Wheat	98	3.38	1.05
1 T sugar	46	--	--
	1,442	60.01	9.07
M			
14 oz. homogenized milk	281	15.75	.18
1 slice fried bacon	48	1.80	.20
1 t peanut butter	38	1.70	.13
1 fried chicken breast	232	26.80	1.30
12 cocktail peanuts	77	2.65	.20
¾ cup speckled beans+ cooked with smoked pork neck bones	523	34.35	9.80
1 medium apple	87	.30	.50
13½ oz. canned sweetened orange juice	208	2.80	1.60
½ cup Cheerios	51	1.70	.55
1 oatmeal-coconut cookie (small)	86	1.32	--
½ cup boiled rice	80	1.60	.60
1 slice enriched white bread	62	2.00	.60
1 t grape jelly	18	--	--
1 t sugar	15	--	--
	1,806	91.77	15.66
N			
17 oz. homogenized milk	342	19.13	.21
2 oz. undiluted evaporated Carnation milk	68	3.50	.05
4 slices bologna	266	17.80	2.60
Stew beef (1x1x½ inch)	73	9.00	1.40
1 cup boiled potato in beef gravy*	118	3.15	.90
2 T Farina, cooked	14	.38	.20
2½ slices enriched white bread	155	5.00	1.50
1 oz. barbecue potato chips	165	1.65	.60
4 Oreo cookies	160	2.36	--
1 t grape jelly	18	--	--
1 t mayonnaise	33	.05	--
	1,412	62.02	7.46
O			
12 oz. Carnation formula (1:1)	260	13.20	.18
2 T Beech-Nut pears (strained)	21	.09	.09
1 t Beech-Nut lasagne dinner (junior)	3	.09	.03
1 t margarine	36	--	--

Table 4.—Detailed 1-day food intake of individuals observed—Continued

Subject	Food energy	Protein	Iron
	(kcal.)	(gm.)	(mg.)
⅓ cup Kellogg's Rice Krispies	53	.80	.25
	373	14.18	.55
P			
½ cup undiluted Carnation evaporated milk	137	7.00	.10
3½ oz. fried porgy fish	279	22.70	1.50
1 cup Campbell's chicken with rice soup	32	2.90	.30
8 oz. glass Tang	110	1.40	.50
1 cup cooked Quaker Oats oatmeal	148	5.40	1.70
1 oz. potato chips	165	1.65	.60
1 cup Beefaroni (macaroni with beef in tomato sauce)	153	7.50	1.90
½ egg & onion matzo	34	1.00	.10
2 T sugar	92	.....	.01
2 chocolate chip cookies (small)	104	1.20	.40
	1,254	50.75	7.11
Q			
14 oz. homogenized milk	281	15.75	.18
2 oz. slice corned beef hash	60	7.10	1.20
1½ scrambled egg	168	10.90	1.65
3½ oz. veal	298	29.60	3.80
2 T peanut butter	230	10.40	.80
½ cup cooked spinach	22	2.40	2.30
½ cup mashed potatoes	94	2.10	.40
4 oz. orange juice	52	.70	.40
2 T Bosco	98	1.00	6.60
½ cup jello	65	1.60	.....
1 t margarine	36	.....	.....
1 oz. Cheese Doodles	141	n.a.	n.a.
	1,545	81.55	17.33
R			
16 oz. homogenized milk	322	18.00	.20
3 small pork sausages	282	10.50	1.20
1 slice liverwurst	79	5.00	1.60
1 slice minced ham	81	4.60	.40
1 oz. chuck roast	94	12.80	1.90
½ cup boiled rice	80	1.60	.60
½ cup pea beans and rice	167	7.50	1.60
5 T potato salad++	111	2.55	.35
3 Ritz crackers	51	.99	.....
½ cup ginger ale	40	.....	.....
4 pieces of candy (Dots)	66	.....	.....
2 t strawberry flavor PDQ milk flavoring	n.a.	n.a.	n.a.
	1,373	63.54	7.85
6 oz. homogenized milk	121	6.75	.08
½ cup Campbell's pork and beans	110	5.54	1.64
2 T peanut butter	230	10.40	.80
1 fried chicken wing	54	6.85	.55
1 cup unenriched cooked rice	160	3.20	1.20
2 slices enriched white bread	126	4.20	1.20
1 t jelly	18	.....	.....
2 t margarine	72	.....	.....
2 T sugar	92	.....	.01
	983	36.94	5.48

*Figures for gravy not available.
**Product values not available. Figures based on Gerber's macaroni with tomatoes, beef and bacon.
#Product values not available. Figures based on custard pudding.
##No ingredients listed. Figures based on "Treet."
+Calculation based on calico beans.
++Calculation based on macaroni salad.
n.a.—not available.

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Discussion

Miss Mary Lynch: How are dietary patterns in Blackston influenced by cultural patterns? What has been the effect of migration from the South to the North?

Mrs. Valentine: Our impression is that among Afro-Americans from all parts of the United States, food preferences in general are derived from a regional pattern that is rooted in the ecology and social structure of the South and shared by both blacks and whites at the lower socioeconomic levels. This dietary pattern is not highly distinctive in the foods given to infants and younger children, though it becomes more different from national, middle class preferences as items of the adult's diet are introduced with advancing age. The main results of moving North are a greater range of commercially available items and some improvement in financial resources. These changes are generally greater for whites than for blacks. Afro-Americans, in the North at least, appear to have participated in major national trends, such as the general abandonment of breast feeding.

Dr. Myrtle Brown: In our experience, also, ethnic customs really have very little effect on the diets of infants. They begin to have an influence somewhere after 1 year of age.

Miss Helen G. Olson: Are any of the food assistance programs of the Department of Agriculture operating in the area in which your observations were made? Are the families eligible and do they participate?

Mrs. Valentine: When we first came to the area, there was a commodity program, and at that time most of the people in this sample did receive commodity foods. They seemed to use these selectively.

Dr. Charles F. Whitten: Would you comment on the manner in which you selected these 15 families? I was surprised that most of the mothers attended well-baby clinics so regularly.

Mrs. Valentine: We were living in the community we were studying. We listed everyone within several blocks who had children under the age of 3. We then started at the top of the list and tried to contact all of them.

Miss Catherine Cowell: How do you explain the fact that drinking fluids other than milk were not reported?

Mrs. Valentine: We did our survey in the winter months, and the patterns do change seasonally. Kool-Aid, popsicles and soda pop are mainly consumed in warmer weather. You will note from our table, however, that some Kool-Aid was used even during the winter.

Dr. Virginia H. Young: The concept of "cultural deprivation" has been seized upon by the education establishment to explain the failure of the poor in school programs that are presented in the social, linguistic and value structure of the middle class. It is therefore highly significant that the research of Jerome, Kiser and West and of the Valentines portrays poor families feeding their children adequately, caring for them with concern, possessing ideals and goals for them, and bringing them up in a tradition of utilizing the productivity of the woods and the backyard plot. When we see the poor in this image, we have to acknowledge that there seems to be no generic failure of intellect, morals, health, energy or habits.

I wonder how the Valentines would account for the high nutritional standards of Blackstonians. Do these result from good public health services, from general public education or from other factors?

Mrs. Valentine: Certainly the answer is not in either of the two possibilities you suggest. Health institutions in Blackston dramatically illustrate the inadequacies of quantity and quality generally found in the major public services of low-income Afro-American communities. There are a few exceptions to this dismal picture in the form of special programs of limited size, such as a federally funded comprehensive child care program at a local hospital. Parents and children alike have also been confined to inferior, segregated, and discriminatory education. The principal expert guidance in infant and child feeding they receive is advice from well-baby clinics. As already noted, this advice is evaluated and accepted selectively.

We believe the feeding practices that we observed reflect the families' great interest in the welfare of the very young, high valuation of food as a source of health and growth, flexible household and kin group patterns that are well-adapted to supporting and caring for dependents, and pragmatic use of common sense and general public knowledge. These patterns appear to be adaptations to the historical and continuing problems of survival under conditions of socioeconomic adversity.

Blackstonians generally manage to feed and care for their youngest offspring adequately in spite of severe individual and family problems commonly associated with poverty. In the sample we have reported, all families live in more or less substandard and overcrowded housing, most households have had to cope with an absence of fathers from time to time, a number include unmarried teenage mothers with their children, several families have one or more heroin addicts among their members, and the majority consume sizeable quantities of alcohol. Indeed these problems are an important part of the context within which early child care customs function. These facts—together with our observations of social service and public health institutions in Blackston—persuade us that such agencies have little to teach Afro-Americans about the art of survival under conditions of inequality. Rather, what is needed to improve levels of nutrition—and of health in general—is a change in the structure and operations of all relevant institutions in the direction of socioeconomic equality.

Mrs. Virginia C. Jauch, Session Chairman: Let us now hear something from Mrs. Alvarez about the Puerto Rican community in Philadelphia, and something from Mrs. Wilcox about low-income Cubans in Dade County, Fla. I shall then report some of our observations of low-income groups in Chicago.

Mrs. Elsa Alvarez: The Children and Youth program, Ambulatory Out-Patient Pediatric Clinic of the Hahnemann Medical College and Hospital, Philadelphia, has an enrollment of 3,714 families with 4,713 children ranging in age from 3 weeks to 14 years. These families are 64 percent Spanish-speaking (mainly Puerto Rican), 30 percent Negroes, and 6 percent Anglos, all living in what is known as "The Spring Garden Community," a poverty area located in Center City. The average number of children per family is six, and average income about $3,000 per year. Weekly rent is generally between $18 and $21.

Ninety-eight percent of the families residing in the community receive some form of Government assistance. Only about 30 percent of the families buy food stamps.

We work with the families in the areas of therapeutic nutrition (e.g., overweight, underweight, iron-deficiency anemia) and preventive nutrition, including nutrition education. Our activities take us into the homes of the families and provide opportunities for observing them and for offering practical advice.

The majority of the adults speak little English. Many are illiterate and they generally lack knowledge of nutrition. They commonly live in overcrowded apartments, and many of these are infested by rats and roaches. The sanitary facilities do not function properly. Oil is used for heating, but heaters are frequently out of order. Very young children are given the burden of care and responsibility for their younger siblings.

The Catholic faith is practiced by the Spanish-speaking members of the Spring Garden Community, but at the same time they practice spiritualism and believe in fortune-telling. Common-law marriage is common. It is important to a family to use the father's name, even though he is not the legal father. There is a strong tendency for relatives to live close to one another.

Even after they have lived in this country for several years, their old food patterns persist. The main dishes are rice, beans, starchy vegetables and roots, codfish and coffee. Children eat these foods from infancy. The frequent concern that I hear expressed about toddlers drinking coffee is misplaced. Our "coffee" is milk with just a little coffee added for flavor. Recipes are usually prepared on the advice of the grandmother or eldest neighbor. Tomatoes and raw carrots are considered rabbit food and are avoided. Milk is not served with citrus fruits or juices. Fish is considered poisonous in winter.

Meat is usually fried and served daily if the food budget permits. Chicken, pork or the cheapest grades and cuts of beef are most commonly purchased. Codfish is very often used.

Breakfast usually consists of coffee, with or without milk, and Spanish crackers. Lunch is likely to be codfish with a starchy vegetable and soda, and supper is rice and beans with soda.

Using data from analyses of foods by various laboratories in Puerto Rico, Mrs. Rosa Marina

Torres from Puerto Rico University has compiled tables of tropical foods. We have found these tables, together with USDA Handbook No. 8, "Composition of Foods," most useful in calculating nutritional values of foods consumed by the Puerto Rican community in Philadelphia.

When a baby is born he is given Similac while in the hospital. As soon as the mother brings the baby home, she feeds evaporated or regular milk, using half milk and half water. The water is seldom boiled, and sterilization methods are not practiced. Breast feeding is practiced by only 3 percent of mothers. The mothers that do breast feed are usually recent arrivals from Puerto Rico.

Commercially prepared strained foods are used alternately with home prepared food, depending upon the finances.

Bottles are given the baby on a demand basis. At about 3 weeks of age, cereal is added to the milk in the bottle. Fruit, fruit juices (especially orange juice) and egg yolk are introduced when the baby is 2 or 3 months of age. Ripe bananas or egg yolk may be mixed with milk in the bottle. Home-made soups may be strained and fed to the infant at age 2 or 3 months.

As the child grows, commercially prepared baby foods are eliminated from the diet and soda becomes a major beverage. Cornmeal may be given to small children during the afternoon as a snack but otherwise cereals are rarely fed after 1 year of age. Bottle feeding may be continued until the child is 6 years old.

Mrs. Mary Ellen Wilcox: Cuban families in Miami are largely concentrated in a central urban section. Local grocery stores and meat markets cater to their buying patterns, and many of the familiar foods are grown or processed locally.

Cuban mothers tend to be permissive about food and eating habits. By North American standards, weaning from the bottle is delayed, and table foods are introduced later than in black families. These mothers attempt to feed their children as well as income allows but health is "by the pound": they prize plump babies. Many Cuban mothers seen in the C & Y clinics are unduly concerned over "poor appetites" of apparently well children. The majority of overweight children seen at C & Y project No. 636 during 1968 and 1969 were of Cuban origin.

The Cuban people are particularly conscious not only of calories but also of protein. Meat is used twice daily and is an important staple of the diet. The first items bought at the grocery store are meat and rice; lower income Cubans tend to eat larger quantities of meat than do Puerto Ricans or other cultural groups of similar income status. A typical shopping list starts with meat, rice, seasoning (green pepper, onion, garlic), lard, beans, coffee, milk, bread, potatoes, malanga or plantains.

Mrs. Marjorie Amable, public health nurse, and Mrs. Levina S. Phillips, nutrition consultant, both of the Dade County Department of Public Health, have provided the following information about foods commonly used by Cubans in Miami: As in Cuba, the day starts with cafe con leche (5 parts milk to 1 part of strong coffee with added sugar) and Cuban bread, with or without butter or margarine. Whereas in Cuba these families would have large meals at noon and in the evening, work patterns in Miami dictate one large evening meal. For main dishes they use a sofrito of onion, green pepper, bay leaf, garlic, cumin, oregano, salt and pepper and sometimes tomato sauce. Ham butts, salt pork, and chorizo (Spanish sausage) are used in many recipes. Rice is often seasoned with saffron. Lard and oil are used in large quantities; many foods are fried. Sugar is used abundantly.

Nutritional health and body fat are considered synonymous. Fat babies are considered healthy and "skinny" children are considered ill. Special cooking is done extensively for the babies and young children. Many starchy foods are cooked, mashed or blended for the young. Strained baby vegetables and fruits are purchased for both babies and young children.

Milk is well accepted and often fed to infants and small children in large amounts. Sugar and vanilla or chocolate are often added. Adults use limited amounts, mostly at breakfast in their cafe con leche. Condensed milk is widely used. Cheese is used as a snack or in sandwiches.

Beef, chicken, pork and fish are especially liked. Palomilla steak, made from cheaper cuts of beef and thinly sliced, is purchased in local markets, marinated in sour orange juice, garlic, salt and pepper, then pounded and pan fried. It is served with chopped onions.

Ground beef is used extensively. Dried beef and fish (especially dried codfish) are well liked but because of cost are not used to the same extent as in Cuba. Black beans, chick peas or garbanzos, red beans, and some white beans are served with rice. Beans and rice (moros) are served with the meat course. Dried beans are widely used, although not as frequently as they were in Cuba. Eggs are served with rice or meat dishes.

Rice is eaten in large quantities once or twice daily. Potatoes are widely used, mostly prepared like french fries, but in thicker pieces, called Spanish cuts. Plantain, ripe or green, is usually fried. Boniato, a white sweet potato; calabaza, a yellow squash similar to a winter squash; and yucca, a variety of cassava, are usually boiled. Soups are made from meat, malanga, potato, calabaza and carrots. Canned soups are rarely used. Lettuce, tomatoes, radishes, and cucumbers are used in salads.

Bananas, oranges, orange juice, coconuts, and canned fruits packed in heavy syrup—peaches, pears and fruit cocktail—are favorites. Pineapples, avocados, mangoes and grapes are widely used in season.

Cuban bread, a white crusty bread similar to Italian bread, is commonly used.

Sugar cane is pressed for the juice, which is served with ice—"guarapo frio." Carbonated beverages are used moderately. Virtually all Cubans like ice cream. Flan, a caramelized, baked custard, is the national dessert. Cuban families do not have dessert every day, and the low-income group uses fewer desserts.

Mrs. Jauch: In 1969, 85 percent of women registered in the Chicago Maternal and Infant Care projects were nonwhite, and 35 percent were receiving public assistance. Most of these people live in multifamily dwellings. Infant feeding practices are similar to those reported by the Valentines—early introduction of strained foods, early introduction of table foods, and feeding on demand. Breast feeding is rare. Bottle feeding may be continued until 18 or 24 months of age. Commercially prepared strained foods are rarely fed after 1 year of age. Junior foods are seldom used.

Each infant appears to establish his own rhythm of eating at an early age, and the mother or other caretaker responds to this pattern.

The majority of our infants continue to receive the proprietary formulas after hospital discharge, with only an occasional mother changing for economic reasons to evaporated milk. The mothers discontinue feeding of formula at about age 3 to 4 months. At this time whole milk is given; sometimes sugar is added. The Blackston infants described by the Valentines appear to make the change from hospital formula to evaporated or whole milk somewhat later than do our infants.

Like the Blackston babies, the majority of our babies are offered cereal at age 1 week. The mothers say they are hungry. Baby cereals are eaten daily until 6 to 8 months of age. Hot adult cereals are then fed; most frequently used are grits, oatmeal, rice, and Cream of Wheat. Often, sugar or salt and margarine are added to hot cereals. Rice is often served with meat gravies.

Fruits and the meat and vegetable combinations are introduced at approximately 3–4 weeks of age. As was true in Blackston, many infants continue to eat some baby foods until 1 year of age.

Table foods are introduced early, usually by 3 to 4 months of age, coincident with discontinuation of formula feeding. Our nurses have observed 3-month-old infants being fed mashed potatoes, mashed green beans, and greens. Margarine or meat-flavored pot liquor is often added to these vegetables. Dried beans, mashed and flavored with pot liquor, are sometimes fed. Vitamin supplements provided by the clinics are well accepted. Custards may be fed at 2½ to 3 months, soft pies and pound cake at 5 to 7 months, ice cream cones as early as 9 months. Other foods not uncommonly fed are potato chips, corn bread soaked in pot liquor, biscuits, soda; Kool-Aid and Coca-Cola.

Mexican-American low-income groups

Cultural determinants of food habits in children of Mexican descent in California*

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INTRODUCTION

Persons with Spanish surnames comprise the largest minority group in California—1,426,538 individuals or 9.1 percent of the State's population in 1960. Many (80 percent) were born in the United States; 228,426 (16 percent) were born in Mexico (*1*). Mexico, which owned California over 100 years ago, has contributed to the population, culture and tradition of the State.

From the time that California became part of the United States until about 1930, transit between the United States and Mexico was unrestricted. With decline of the economic situation in the United States in the late 1920's and early 1930's the stream of migration slowed. However, since 1940, there has been an increase in migration, both legal and illegal (*2*). Thus, the "Mexican" may be native to the area and be Mexican-American; or, a Mexican national, he may have entered legally (bracero or "green card" holder) or illegally (wetback) to work or live.

While these immigrants varied widely in culture, level of literacy, religion, language, racial stock and experience, mostly they were peons and mestizos, poorly educated, Catholic, without any special skills. Burma (*2*) points out that folklore, tradition and custom played large roles in their lives, particularly since many of the elders were illiterate. The major difference between Mexican immigration and that of other ethnic minorities in this country is that the Mexicans can and do go back and forth across the border, renewing culture, customs, tradition and folklore.

There are four groups of Mexicans in California in various stages of acculturation: middle-class Mexican-Americans, frequently descended from many generations born in California and exhibiting many characteristics of the dominant middle-class culture; the second- and third-generation Mexican-Americans at various stages of acculturation, but still clinging to some of the customs, culture and traditions of their parents and grandparents; first generation or Mexican nationals who are well versed in all the traditions, cultures and customs of Mexico, holding tenaciously to these beliefs and practices while speaking nostalgically of returning home; migrant farmworkers who may be drawn from any of the three mentioned groups, but for reasons of constant travel, low income, and extremely low edutional level, are less likely than the other groups to acculturate to dominant middle-class customs.

Families in California with Spanish surnames tend to be larger than other white and nonwhite families. In 1960, almost one-fourth (24.1 percent) of such families were comprised of six or more

*The data relative to San Ysidro, Calif., were obtained through support received under a memorandum of agreement between Los Angeles Children's Hospital and Columbus Children's Hospital Research Foundation (Grant H-170, Maternal and Child Health Service, U.S. Dept. of Health, Education, and Welfare); Grant 9854 from Office of Economic Opportunity; and funds from the Associated Student Body of the University of California, San Diego.

persons. Among nonwhite families 18.6 percent had six or more persons, and among white families in general, only 10 percent had six or more. In addition, families with Spanish surnames include a predominance of young people, with 70.4 percent under 35 years of age. Individuals under 15 years of age made up 38.6 percent of this ethnic minority group.

In 1960, the educational level was below that of the white and nonwhite population; more than half of the men with Spanish surnames and almost half of the women over 14 years of age had completed less than 8 years of school (*1*). This low level of educational attainment results in part from the fact that school attendance in Mexico is compulsory for only 6 years and in part reflects a failure of the U.S. educational system to reach many persons of Mexican descent.

The median income in 1959 of men with Spanish surnames was $3,849; nearly 20 percent of the families had annual incomes of less than $3,000. Both the low educational achievement and the low-income status of families with Spanish surnames are germane to consideration of food habits, since it has been shown that food habits are related to the educational level of the mother (*3*) and that individuals with low incomes generally have relatively low intakes of nutrients (*4*).

Thus, there are a number of reasons for evaluating habits and customs of families with Spanish surnames: many have immigrated from Mexico with attendant habits, customs and culture; the families are commonly large with a predominance of young persons; educational achievement of both mother and father is frequently low; income is frequently low.

ATTITUDES TOWARD FOOD

Burgess and Dean (*5*) have pointed out that, in Mexico, the distribution of available food among members of the family is determined by the cultural pattern, and food habits are preserved by the older members of the family and perpetuated in the younger members through attitudes to and concepts of health and disease, and through the transmission of traditional ideas regarding food values. Jelliffe and Bennett (*6*) have categorized customary practices into four classifications according to their public health value:

> (1) Beneficial practices which should be supported and adopted in local health teaching; (2) neutral practices which appear to have no significant scientific value and should be left alone; (3) unclassifiable practices which should also be left alone pending further observation and consideration; (4) harmful practices which require alteration, but alteration in a way that will permit the essence of culturally accepted practice to be retained.

The most important single set of ideas governing food-related behavior in Latin America is a folk manifestation of Greek humoral pathology, modified and developed in the Arab world, diffused to Spain, and transmitted to Spanish-America at the time of the conquest (*7*). As indicated by Clark, (*8*) these ideas have been transmitted to the United States in the migratory process. Foster (*7*) briefly reviews these ideas as follows:

> Foods, herbs, illnesses and bodily states (such as sleeping and pregnancy) are characterized by degrees of "hot" and "cold"; sometimes actual temperature is involved, as when a person becomes overheated by the sun or wet from contact with cold water, but more often the putative degrees of heat and cold are innate characteristics, or properties, of substances. "Hot" illnesses or bodily states are treated with "cold" remedies.

Clark (*8*) has listed "hot" and "cold" foods as designated by the people of Sal si Puedes, Santa Clara County, Calif. (Table 1).

Food in Pregnancy and Lactation. Sanjur et al. (*3*) in their study of a southwestern Mexican village did not find that food was restricted during pregnancy. This is in contrast to practices in Peru, (*9*) where the mother consumes less meat, eggs, fresh fruit and vegetables, and among the Mexican-Americans in Sal si Puedes, (*8*) where "hot" food items are avoided during pregnancy. In *Pedro Martinez* (*10*) Experanza indicated that "cold" foods were to be avoided even during the menstrual period, whenever it was economically possible to do so. In the immediate post partum period (40 days), "cold" foods are avoided in Peru (*9*) and Mexico (*3, 7*) and by Mexican-Americans in Sal si Puedes (*8*).

Food in Infancy. Mexican infants in the past have been breast-fed, frequently until 2 to 3 years of age (*10, 11*). Supplementary foods consisted of gruel (atole), usually made of corn flour or cassava, rice gruel, pumpkin, sweet potato, tortilla, bread, bean soup and sometimes fruit. Meat and eggs were not given since they were thought to be responsible for digestive disorders in weanlings (*12*). Patterns of infant feeding by Mexican-

American mothers in Sal si Puedes (*8*) were similar to those in Mexico—i.e., breast feeding was practiced by about 40 percent with the idea that prolonged breast or bottle feeding (3–4 years) was "good." Cereals were generally introduced at 3 to 4 months of age and some fruits were introduced at about 6 months of age. Thus, the quantity of solid foods given during the first year of life was usually small, at least so long as the child was nursing or receiving formula.

Jelliffe (*13*) points out that prestige foods and "physiological group foods," which are usually protein in nature, frequently bypass the pregnant woman and young child, being reserved for elder males in the community. These "cultural blocks" may frequently limit or delay the introduction of available protein foods for young children.

Food in Illness. Villagers in Mexico know that food is related to health and illness, but they tend to see this relationship in a negative rather than positive fashion. There is little recognition that a balanced diet promotes good health; rather, a person who enjoys good health can afford the luxury of eating what he wants or can afford. Because of these beliefs about the relationship of food to health, food thought to be in conflict with body equilibrium during illness is withdrawn from the diet (*7*).

Clark (*8*) has stated that in Sal si Puedes dietary regulation is thought to be vital to good health and that many disorders are traced to imbalanced intake of "hot" and "cold" foods or to inclusion in the same meal of foods which are extreme opposites in heat and cold. Thus, folk concepts from Mexico of disease are still important to Mexican-Americans; it would appear that many of these beliefs persist in the thinking of second- and third-generation Mexican-Americans.

FOOD PRACTICES

To gain perspective on the role of culture and tradition and its influence on food habits of infants and children in families of Mexican descent, five studies will be reviewed. The first was conducted in southwestern Mexico (*3*) and the second in a border zone of northeastern Sonora, Mexico (*14*), areas from which migration to the United States is frequent. The other three studies were conducted in the United States; the first in San Ysidro, Calif.—a semirural community south of San Diego, bordering Tijuana, Mexico (*15*); the second in East Los Angeles (*18*); the third, concerning migrant farmworkers, in Hanford, King's County, Calif. (*16*).

Southwest Mexico

Sanjur (*3*) assessed feeding patterns and weaning habits in a group of 125 infants in a village of 6,000 population, 65 miles southwest of Mexico City. Feeding patterns and weaning habits were correlated with mothers' social characteristics and other presumably related background factors.

Diet During Pregnancy and Lactation. It was found that before delivery a pregnant woman does not eat special foods to nourish herself or the baby. Of 125 mothers, 90 percent indicated no modification of their regular diet during this period. In contrast, many foods were restricted during the postpartum period and lactation. Foods such as vegetables, fruits, milk, eggs, and meat were frequently excluded from the diet (Table 2).

As pointed out by Lewis (*10*), foods are excluded or included in the diet during this period based on their classification as "hot" or "cold".

Food in Infancy. Breast feeding of the neonate was begun on the second day of life in 22 percent of the cases, on the third day in 49 percent. This delay in feeding was attributed to two factors: 14 percent of the mothers considered colostrum unfit for the child, while 38 percent of the mothers stated that "milk does not come down" until the third day. During the period of time before initiation of breast feeding, herb teas such as yerba buena (spearmint), manzanilla, cinnamon, oregano, rosa de castilla, anise, lemon and orange leaves were given. These teas are considered to have medicinal effects and are recommended for stomach ache (colico).

Breast feeding was begun by the third day in 87 percent of the cases. Only one of the 125 mothers reported inability to breast feed. In the event of inability to breast feed, 65 percent of the mothers indicated that they would choose bottle feeding over "communal" feeding. Of the infants 61 percent were exclusively breast-fed during the first 3 months of life, whereas only 9 percent were completely breast-fed at the age of 9 months. Infants were generally fed on demand—whenever they cried, night or day. However, some 40 percent of the mothers were in favor of a more rigid feeding schedule. Human milk and herb teas were the basic diet during the neonatal period. However, by 6 months of age, cow's milk, fresh, powdered or evaporated, or goat's milk was offered to 60 percent of the infants.

Fruits (mainly banana, orange and apple), bean soup (caldo de frijol) and tortilla were given to about 40 percent of the infants by age 6 months. Sanjur (*3*) believes that the mother's readiness to introduce these foods, rather than availability of the foods, determines whether they are given to the infant.

Other food items were introduced during the first 6 months of life; however, they were not consistently used by all infants. These items were gruel (atoles); bread, crackers, cookies; a watery noodle soup (sopa aquada); cocoa or coffee with milk; eggs and jello.

Cow's milk given to the children was almost always boiled, primarily because unboiled milk was considered to be "cold." Flavoring agents, such as cinnamon, lime leaves, chocolate and coffee were used for the same reason. Plain cow's or goat's milk was little used. An imitation apple-flavored soft drink (manzanita) was very popular, particularly when children were ill with diarrhea or fever.

The age at which infants could be expected to share fully in family meals was believed by 5 percent of the mothers to be 9 to 11 months, by 45 percent to be 1 to 2 years of age, and by 46 percent to be 2 years or older.

Food in Illness. The notion was widespread that a "healthy" child could afford to eat, rather than that a balanced diet promoted health. Mothers often prohibited foods even to healthy children. Fruit, avocado, beans (frijoles) and pork were the foods most frequently eliminated from their diets. Children were cautioned not to eat hot pepper or too many thick tortillas, since their "heat" might cause colic. Up to 2 years of age, protein-rich foods were removed from the diet of a child who developed symptoms the mother attributed to worms. During fever, diarrhea or measles, food was generally restricted; 44 percent of the children had restrictions with fever, 66 percent during diarrhea, and 78 percent during measles.

Agua Prieta and Esqueda, Sonora, Mexico

Three distinct cultures are being mixed in this border zone in the northeastern part of Sonora: the "regional" of Mexico, the "semi-American" of the highlands of Mexico, and that of the United States. This mixing of cultures gave opportunity to study the effects on food habits. Investigators of the Division of Nutrition of the National Institute of Nutrition in Mexico studied 273 families from the city of Agua Prieta and 99 from the rural community of Esqueda (*14*). Infant mortality rates in the area were high—106 per 1,000 live births compared to 63 per 1,000 live births for all of Mexico. The high level of infant mortality was thought to be related to early weaning from the breast and a lack of knowledge on how to achieve maximum nutrition and minimal contamination.

Families chosen for study were classed into one of three economic categories: average- or high-income families, low-income families, and rural families. All children between the ages of 9 months and 5 years were studied to obtain information on food habits. The investigation included 55 children in the average- and high-income category, 70 in the low-income category, and 72 in the rural category.

Food in Infancy. The pattern of breast feeding was variable (Table 3). Many mothers did not breast feed, while some continued breast feeding for more than 18 months. A greater percentage of children were never breast-fed in average- and high-income families than in low-income and rural families.

Great variability was also noted in introduction of solid foods. This is presumably due to the fact that Agua Prieta is in a transitional situation, mixing the native custom of late introduction of solid foods with the American custom of early introduction.

Cow's milk (fresh or evaporated) was introduced into the diet during the first 6 months of life in two-thirds of infants in the average- and high-income families, in one-half of those in the low-income families, and in 10 percent of those in the rural families. In the rural families, one-fourth of the children older than 9 months had not been given milk other than human milk at the time of the family interview.

Table 4 indicates the age of introduction of various foods. The wheat tortilla is given to the young child, although it is not widely consumed by the adults. There was great similarity in introduction of bread and soups in all income levels. Beans, eggs and meat were all introduced into the diet earlier in families of average and high income than in low-income and rural families. This may be partially related to economics, since almost 12 percent of children under 6 months of age in the average- and high-income families had been introduced to commercially prepared strained meats,

whereas none of the children of rural families in this age range had received such meats.

Fruits and fruit juices were introduced into the diet earlier in average- and high-income families than in low-income or rural families. In many of the rural families fruits had not been given. Neither commercially prepared strained vegetables nor home-prepared vegetables were widely used. In the rural and low-income families, a high percentage of the children had not been given vegetable purees or juices. Although it is customary to give chile to children, it was not widely used by the groups studied: 11.8 percent of the children in average- and high-income families, none of those in the low-income families and 3.2 percent of those in the rural families had received chile.

San Ysidro, California

This semirural community of about 8,000 population, bordering Tijuana, Mexico, is a frequent temporary location of individuals entering the United States from Mexico. Infant and child feeding practices of people of Mexican descent in this community are probably influenced by the number of people of Anglo and/or other cultures in the area, birthplace (United States vs. Mexico), length of time in the United States, parents' education, language, socioeconomic status, whether the family has a physician and, if so, his location (United States or Tijuana, Mexico), and by the type of people who migrate.

Data presented here were accumulated as part of a larger study of nutritional and developmental surveillance of Mexican-American children in San Ysidro, from birth to 6 years of age. Demographic data and food habits relating to children from birth to 3 years of age will be presented. The total study population was randomly chosen by utilizing records of the local school district, All individuals of Spanish surname were identified and, from these, 200 families were randomly chosen to participate, provided they were of Mexican descent, had children of the appropriate age, and were willing to participate. Bilingual interviewers then visited the homes to ascertain the presence of children of the appropriate ages. From this larger population, 80 children from birth to 3 years of age (Table 5) and their families were identified for study. Descriptive data concerning families of those children are presented in Table 6.

Half of the families had yearly incomes of less than $5,000. Yearly per capita income averaged $767. The mean educational level was 6.9 years. Of the 80 mothers, 14 had completed 3 years or less of school, 29 had completed 4 to 6 years, 14 had completed 7 to 9 years, and 19 had completed 10 to 12 years. No response regarding schooling was obtained from four mothers. The relevance of mothers' educational levels to feeding practices has been well documented (*16*, *3*).

Feeding Methods and Eating Habits. Information on methods of feeding in the first week and the second month of life was available for 79 of the 80 children. During the first week of life 60 of the 80 infants were fully bottle fed; 18 were fully breast fed; one was fed both at the breast and by bottle. By age 2 months, 69 were bottle fed and 10 were breast fed. Dietary records of 56 of the children (70 percent) were obtained. These data are summarized in Tables 7–9. At the time of the study, only one child was breast fed and he was in the 0–6 months age group. Of the 33 children over 18 months of age, 36 percent still received milk from a bottle. Feeding of strained foods was common during the first 18 months of life. Junior foods were rarely fed. Eleven of the 12 children 19 to 24 months of age and all of the children 25 to 36 months of age were receiving foods from the family table.

Frequency of eating by the children varied from two to nine times daily with a median of four times. This is in contrast to the two meals a day stated to be the rule in some developing countries (*7*, *13*). Infants 7 to 12 months of age ate more frequently than other age groups.

"Cultural" foods other than suera (sugar water) were infrequently given to young infants, but children over 19 months of age were generally offered rice, corn tortillas, flour tortillas and frijoles.

Daily Food Intake. Diet records for 1 day for 56 children were evaluated to determine the amounts consumed of milk, meat, breads and cereals, vegetables and fruit, and fat, as well as the number of different food items ingested in 1 day. For ease of calculation, a serving was considered to be the same as that used in diabetic exchange lists (*17*). The number of different food items eaten daily was evaluated to obtain some index of variety in the diet.

Mean intake of milk and meat appeared adequate in all age groups (Table 8). Milk intake was

comparable to that found by Burroughs and Huenemann (*18*) in infants and children of rural families in Coachella Valley of southern California. Infants less than 6 months of age were not offered meats in any form. Most children received an inadequate number of servings of food items in the bread-cereal and vegetable-fruit groups. Fats were used in the diets in significant amounts beginning at 1 year of age. In Mexico, according to Ramos-Galvan (*11*), intake of fat by children is inadequate. Food items that fitted into none of the previous categories were listed as miscellaneous. These items, such as sugar, carbonated beverages, cocoa, chocolate, etc., contributed calories to the diet at all age levels. However, children 19 to 24 months of age had a greater intake of these items than did children of any other age group. Judged by the number of different food items eaten daily, there appeared to be a greater complexity of diet with increasing age (Table 8).

Frequency of Use of Foods. Food use was assessed by the following categories: milk, protein-rich foods, breads and cereals, vegetables and fruits, and fat. Homogenized milk was used by 45 of the 80 children and diluted evaporated milk by seven (Table 9). Commercially prepared formulas (Similac, Enfamil, Modilac with iron) were fed to four infants, all less than 6 months of age. As previously mentioned, one infant was breast fed. Two infants in the 19 to 24 months age group were fed nonfat cow's milk.

Eggs and beef were the most frequently used high protein foods (Table 9). Of items in the bread and cereal group, dry cereals, Irish potato, rice, infant cereals and white bread were most commonly fed. All of the infant cereals were sold by one manufacturer (Gerber), and choices of cereal were nearly equally distributed between high protein, mixed, oatmeal and rice. It may be seen from Table 9 that most of the infants receiving these cereals were less than 1 year of age. As had been found by Sanjur et al. (*3*) for children in southwestern Mexico, bananas and oranges were the most frequently consumed fruits in San Ysidro. Frozen fruits and vegetables were rarely used. Other items were either fresh or canned. Of the relatively few vegetables used, stewed vegetables (caldo), fresh tomatoes and tomato sauce were most common.

Fats most frequently used were shortening, butter and lard. This was perhaps a reflection of the number of families receiving "commodity" foods; Sanjur indicated that fats most frequently used in Mexico were lard and cottonseed oil.

Foods Mothers Considered to be "Good" for Children. The 80 mothers were asked what foods they considered to be good for their children—i.e., health foods or body builders. Fifty-three women mentioned meat; 38, milk; 33, vegetables; 22, soup; 21, fruit; 20, eggs; 8, cereal; and 7, potatoes. Candy, corn, jello and liver were each mentioned only once and chop suey, fish, ice cream, juice and tortilla were each mentioned twice. Orange juice, chicken, rice, beans, cheese and oatmeal were mentioned three to five times. When food items mothers considered to be "good" for their children were classed according to the "basic four" food groups, foods in the meat group (beans, cheese, chicken, eggs, fish, liver and "meats") were mentioned in 90 instances by the 80 mothers. Fruits and vegetables were mentioned 59 times; milk, 38 times; breads and cereals (cereal, corn, oatmeal, pasta, potato, rice, tortilla), 29 times; and other items (candy, chop suey, ice cream, jello, soup, "anything"), 29 times. It appeared that, in regard to the meat group, mothers were practicing what they knew about nutrition. However, what influences were modifying their practices with respect to vegetables is unknown.

Vitamin and Mineral Supplementation. At the time of the survey, 34 of the 80 children were receiving supplements (Table 10). Of the 69 children more than 6 months of age, history of supplementation of the diet between 3 and 6 months of age was as follows: 24 had received no supplementation, 39 had received a vitamin supplement, two had received an iron supplement, and four had received supplements of both vitamins and iron.

East Los Angeles, California

As part of a preliminary study (*15*) on nutritional status of Head Start Mexican-American children in East Los Angeles, information was obtained on birthplace, income, and family size, as well as on breast and formula feeding, weaning time, utilization of vitamins and the introduction of solid foods. Retrospective information was obtained concerning 41 children from 26 families.

Of the 21 mothers for whom information on birthplace was obtained, 12 had been born in the United States (nine in California and seven of these in Los Angeles County), and eight had been born in Mexico. The mean length of time the fami-

lies had been in the United States was 12.5 years with a median of 7 years. Five families had lived in Los Angeles County 25 years or more, five other families from 10 to 25 years; the remaining 11 families had lived in the area from 1 to 7 years.

Four of the 20 families for which income data could be obtained had yearly per capita incomes of less than $500, 15 had yearly per capita incomes of $500 to $1,000, and only one had a yearly per capita income greater than $1,000. Five of the 26 families were receiving general public assistance and three were receiving Aid to Families with Dependent Children.

The mean family size was 5.8 individuals; the median, six.

Feeding Practices. Information was obtained by questionnaire concerning breast and bottle feeding, age of weaning, utilization of vitamin supplements, age of introduction of solid foods and the mother's knowledge of nutrition.

Of 41 infants, 13 had been breast fed, three for as long as 9 months and one for 12 months (Table 11). Only two of the 23 infants for whom duration of bottle feeding was known were fed by bottle after age 12 months. Of the 30 bottle-fed infants for whom information was available, 10 received evaporated milk formulas, nine received Similac, and 11 received various other formulas, including homogenized cow's milk, Enfamil, Soyalac and Carnalac. Of 40 mothers, 32 stated that they had administered supplements of vitamins; many had done so over prolonged periods of time.

Early introduction of strained foods appeared to be the rule. Of 36 infants for whom information on this point was available, 19 received strained foods before 3 months of age. Strained foods were introduced into the diets of 13 infants between 3 and 6 months of age and into the diets of four infants after 6 months of age.

Combinations of foods were more frequently introduced than were single food items. For instance, eight of the mothers introduced a combination of fruit and cereal initially while combinations of fruits, cereals, vegetables and meats were often used. Five of the mothers stated that they had used chopped or mashed table foods from the beginning. Possibly, these families were not able to afford strained baby foods in addition to the regular foods the rest of the family ate. Eggs were not introduced at an early age.

Table foods were introduced early in comparison to ages considered proper in southwestern Mexico (*3*). Of 40 infants for whom information was available, nine had received table foods before 6 months of age. Table foods were introduced into the diets of 11 children between 6 and 9 months of age. On the other hand, 17 children did not receive table foods until after 1 year of age. Kinds of table foods offered most frequently consisted of food combinations (26 of 35 children). These food combinations consisted of meats and soft, easily chewable foods such as some vegetables, rice, frijoles and mashed potatoes. Mothers were asked if any foods should be restricted for the young child and the lactating mother. Nine of 26 mothers responding stated that meat and eggs should be eliminated from the diet of the young child because they were irritating. Of these mothers, 13 stated that gas-forming and highly seasoned foods should be eliminated from the diet of the nursing woman.

Beliefs that certain foods should be eliminated from the diets of infants and lactating women may be related to the "culture of poverty" within the "barrio"—here the Mexican-American community—with further limitations on married women imposed by "machismo"—i.e., once women enter the barrio they do not leave for social, cultural or minor medical purposes (*19*).

Hanford, California

Bowden (20) has studied nutritional beliefs and food practices of 35 Mexican-American mothers in Hanford, King's County, Calif. About one-half of the fathers in the group were farm laborers. Of the mothers, 15 had been born in California, 11 in Texas, seven in Mexico, one in New Mexico and one in Oregon.

The mean number of school years completed by the mother was 6.9, with 1 year the shortest period of school attendance and 12 years the longest. Five mothers had completed from 1 to 3 years of schooling, nine had completed 4 to 6 years, 15 had completed 7 to 9 years, and six had completed 10 to 12 years.

Mean family size was 6.7 individuals; families were slightly larger than those of Mexican-American families in San Ysidro or East Los Angeles.

The yearly per capita income of these families was $392. Welfare payments contributed to the in-

come of 74 percent of the families. All families had incomes falling within the poverty classification of the Office of Economic Opportunity Poverty Guidelines (*21*).

Nutritional Beliefs. In addition to a number of other questions, each mother was asked what foods should be eaten every day for health, in her own case and in the case of a pregnant woman, a lactating woman and a child. Answers were rated by the number of "basic four" food groups mentioned. In response to the question of what foods should be eaten every day for health, three women said they did not know. However, as may be seen from Table 12, the women generally demonstrated good understanding of the merits of fruits and vegetables, good recognition of the value of the meat group, fair appreciation of the value of milk, and little awareness of the value of the bread and cereal group. None of the women mentioned the common Mexican-American foods listed by Mann (*22*) as good and fair sources of vitamin C (chile peppers, guavas, cactus leaves).

When asked whether a pregnant woman should "eat for two," 20 percent of the women said they did not know. Forty-three percent did not believe that the pregnant woman should "eat for two," whereas 34 percent felt that she should "eat for two." One woman stated that a pregnant woman should eat less.

The mothers were asked whether they had ever heard of "hot and cold" foods. None of the mothers admitted knowledge of this concept.

The questions regarding types of food which the mother considered "harmful" to herself, to a pregnant or lactating woman, and to a child were intended to reveal other folk beliefs and food misinformation. A tabulation revealed that chile peppers, dried beans, and pork—all common items in the mothers' diets—were most frequently named as harmful (Table 13).

SUMMARY

Migration patterns of families from Mexico appear to have a definite effect on food habits, beliefs and practices. Mothers in southwestern Mexico hold a body of beliefs that are transmitted from mother to daughter. Beliefs affect food intake during lactation, childhood and illness; frequently, protein foods are limited during these critical periods. Breast feeding was the preferred method of feeding in southwestern Mexico.

With migration to border areas, there was a precipitous decline in the practice of breast feeding. Bottle feeding was frequently continued for prolonged periods. A number of food items were introduced into the diet during the first 6 months of life; however, meat was not commonly introduced during this period—perhaps due to the belief that meat is irritating to the young child.

In the East Los Angeles area, breast feeding was practiced by a greater percentage of women than in the border areas. Strained foods, excluding meat and eggs, were frequently added to the diet before 3 months of age. Mothers held to beliefs that certain foods should be eliminated from the diets of infants and nursing mothers. These beliefs held by women in the East Los Angeles barrios may be related to their entrance into the barrio with its "culture of poverty" with further limitations of married women imposed by "machismo." There appeared to be more free exchange with other cultural groups in border areas than in East Los Angeles.

Mothers in Sal si Puedes still held to many beliefs of "hot" and "cold" foods. Although mothers in Hanford, Calif., denied knowledge of this concept, a number of food items considered harmful in Hanford fitted well into the classification of "hot" and "cold" foods.

Low educational achievement, large families, inability to speak English, social and class discrimination, subtle racial discrimination, and low income may have contributed to decreased communication with other cultures, particularly in the barrio. Occasional visits to Mexico by those in Los Angeles, as well as entering migrants from Mexico, may have helped to perpetuate beliefs and practices.

Table 1.—Foods designated as "hot" or "cold" by persons of Sal si Puedes, Santa Clara County, Calif. [1]

Food types	Designation "hot" or "cold"				
	Very hot	Hot	Temperate	Cold	Very cold
Vegetables	Chile pepper green red Garlic	Onion		Beans, green Beets Cabbage Cauliflower Coriander Parsley Peas Pumpkin Radish Squash Turnip	Cucumber Pickles Purslane Spinach Tomato
Meats and milk	Crackles	Capon Fish Milk, goat Pork Turkey	Goat	Beef Boar Lamb Milk, cow Milk, donkey Mutton Rabbit	Hen or pullet Milk, human
Starches and sweets	Beans, white	Barley Bread, wheat Beans (habas) Chick peas Potato, Irish Potato, sweet Rice Sweet rolls Tortillas, wheat Wheat Honey Sugar, brown Salt	Beans, pinto Sugar, white	Beans, red Lentils Oatmeal Tortillas, corn Vermicelli	

[1] Data of Clark (*5*).

Table 2.—Percentage of respondents in a southwestern Mexican village reporting that specified foods were permitted or restricted post partum or during lactation [1]

Permitted	Percent of Respondents	Restricted	Percent of Respondents
Soups (chicken broth, sopa aquada)	86	Avocado	54
Atoles	85	Fruits	50
Toasted tortillas	83	Pork	43
Boiled milk	56	Red beans	41
Chicken, beef	50	Vegetables	15
Black bean broth	47	"Red" meat	12
Charcoal broiled cheese	45	Milk, cheese, eggs	17

[1] Data of Sanjur, et al. (*8*).

Table 3.—Duration of breast feeding in a border zone of northeastern Sonora, Mexico [1]

Duration of breast feeding (months)	Upper[2] income (percent)	Lower income (percent)	Rural (percent)
Less than 6	27.5	18.0	11.0
6 to 12	15.7	27.9	14.1
13 to 18	19.6	27.9	37.5
More than 18	7.8	13.1	23.3
Other[3]	29.4	13.1	14.1

[1] Data of Division of Nutrition, National Institute of Nutrition, Mexico (*14*).
[2] "Average or high."
[3] Bottle fed since birth.

Table 4.—Age of introduction of various foods into the diets of infants in a border zone of northeastern Sonora, Mexico [1]

Food	Percent of children receiving food at various ages				Never given
	Less than 6 months	6–12 months	13–18 months	More than 18 months	
Tortilla:					
Wheat:					
Upper[2] income	9.8	35.2	37.3	13.8	3.9
Lower income	8.2	37.7	45.9	6.5	1.7
Rural	18.8	46.8	25.0	4.7	4.7
Corn:					
Upper income	7.8	23.5	15.7	23.5	29.5
Lower income	5.0	18.0	37.7	8.2	31.1
Rural	7.8	32.8	15.6	7.8	36.0
Bread:					
Upper income	13.7	35.3	33.3	4.0	13.7
Lower income	11.5	34.5	36.0	6.5	11.5
Rural	11.0	46.9	29.7	6.2	6.2
Pasta and Rice Soups:					
Upper income	21.6	47.1	25.5	1.9	3.9
Lower income	13.8	48.2	28.4	4.8	4.8
Rural	18.0	50.6	25.0	1.8	4.6
Beans:					
Upper income	33.3	45.1	11.8	7.8	2.0
Lower income	28.0	31.1	29.5	5.0	6.4
Rural	29.7	48.4	17.2	0.0	4.7

Table 4.—Age of introduction of various foods into the diets of infants in a border zone of northeastern Sonora, Mexico [1]—Continued

Food	Percent of children receiving food at various ages				Never given
	Less than 6 months	6–12 months	13–18 months	More than 18 months	
Eggs:					
Upper income	35.2	35.2	13.8	11.8	4.0
Lower income	24.5	31.1	26.2	9.8	8.4
Rural	17.2	36.0	25.0	14.0	7.3
Meats:					
Commercially prepared strained:					
Upper income	11.7	17.7	5.9	1.9	62.8
Lower income	3.3	6.6	4.9	3.3	81.9
Rural	0.0	1.6	1.6	0.0	96.8
Other:					
Upper income	4.0	15.6	11.7	9.9	58.8
Lower income	1.6	11.6	18.0	16.3	52.5
Rural	3.1	23.4	35.9	6.3	31.3
Fruits:					
Commercially prepared strained:					
Upper income	33.3	19.6	3.9	2.0	41.2
Lower income	31.1	21.3	3.3	3.3	41.0
Rural	7.8	12.5	1.6	3.1	75.0
Other:					
Upper income	13.7	27.5	11.8	1.9	45.1
Lower income	23.0	21.3	9.8	5.0	40.9
Rural	11.0	25.0	7.8	7.8	48.4
Fruit juices:					
Commercially prepared strained:					
Upper income	31.4	29.4	3.9	0.0	35.3
Lower income	29.5	26.3	8.2	1.6	34.4
Rural	7.9	28.0	7.9	1.6	54.6
Other:					
Upper income	17.6	15.7	5.9	3.9	56.9
Lower income	21.3	16.3	3.3	6.6	52.5
Rural	6.3	18.8	10.9	4.6	59.4
Vegetables:					
Commercially prepared strained:					
Upper income	15.6	25.6	5.9	0.0	52.9
Lower income	3.8	6.5	0.0	3.3	86.4
Rural	0.0	1.6	0.0	0.0	98.4
Other:					
Upper income	3.9	19.6	7.9	2.0	66.6
Lower income	5.0	8.3	4.9	3.2	78.6
Rural	1.6	6.2	3.2	6.2	82.8

[1] Data of Division of Nutrition, National Institute of Nutrition, Mexico (14).
[2] "Average or high."

Table 5.—Age and sex of children less than 3 years of age in San Ysidro, Calif.[1]

	Number of children					
	Age (months)					
	Less than 6	6–12	13–18	19–24	25–36	Total
All children	11	11	12	14	32	80
Males	3	4	7	8	21	43
Females	8	7	5	6	11	37

[1] Data of Aranda et al. (unpublished).

Table 6.—Descriptive information concerning mothers and families of children studied in San Ysidro, Calif.[1]

Birthplace:	No. of mothers
United States	20
Mexico	60
Years in United States:	
No answer	3
Less than 1 year	1
1 to 5 years	15
5 to 10 years	22
More than 10 years	39
Education of mothers:	Years
Mean	6.9
Median	6
Range	0–12
Family income:	No. of families
No answer	3
$1,000 to $2,999	11
$3,000 to $4,999	39
$5,000 to $6,999	17
$7,000 to $8,999	10
Family size:	No. of members
Mean	5.9
Median	5
Range	3–13
Location of family physician:	No. of families
In United States	35
In Tijuana	15
No physician	30

[1] Data of Aranda et al. (unpublished).

Table 7.—Methods of feeding and types of food fed to children less than 3 years of age in San Ysidro, Calif.[1]

	Number of children					
	Age (months)					
	Less than 6	6–12	13–18	19–24	25–36	Total
Present feeding method:						
Bottle	6	7	7	5	7	33
Breast	1					1
Cup/glass			1	7	14	22
Present food consistency:						
None	2					2
Strained	5	5	5	1		16
Junior		[2]1				[2]1
Table		2	4	11	21	38
Number of times child eats daily:						
Mean	5.4	6.3	4.4	4.0	4.2	4.6
Median						4
Range	4–8	3–9	2–7	3–5	3–7	2–9
Number of cultural foods daily:						
Mean	0.3	0.6	0.2	1.0	1.0	0.7
Range	0–1	0–1	0–1	0–3	0–3	0–3

[1] Data of Aranda et al. (unpublished).
[2] Also receiving strained foods.

Table 8.—Daily intakes of various foods by children less than 3 years of age in San Ysidro, Calif.[1]

Type of food	Age (months)				
	Less than 6	6–12	13–18	19–24	25–36
	(7)[2]	(7)	(9)	(12)	(21)
Milk, ounce:					
Mean	26	30	21	22	18
Median	24	28	16	21	16
Range	22–32	16–49	9–40	8–48	4–48
Meat, ounce:					
Mean	0	2.9	1.8	3.3	3.7
Median	0	2	2	3.5	4
Range	0	0–11	0–4	1–6	0–10
Bread-cereal, serving:					
Mean	1.8	1.4	2.1	3.3	3.5
Median	1	1	2	3	3
Range	0–8	1–3	0–6	2–6	0–8
Vegetable-fruit, serving:					
Mean	1.1	2.3	3.2	1.4	2.0
Median	0	1	3	1	1
Range	0–4	0–9	0–11	0–3	0–11
Fat, serving:					
Mean	0	0.3	2.0	2.3	2.5
Median	0	0	2	2	2
Range	0	0–2	0–4	0–6	0–8
Miscellaneous items,[3] serving:					
Mean	0.9	0.9	1.1	2.2	1.5
Median	1	1	1	2	2
Range	0–2	0–1	0–2	0–5	0–4
Number different food items:					
Mean	3.7	0.8	8.4	10.8	9.2
Median	3	6	8	11	9
Range	1–8	5–10	4–13	5–16	6–13

[1] Data of Aranda et al. (unpublished).
[2] Values in parentheses indicate number of children in each age group.
[3] Sugar, carbonated beverages, cocoa, chocolate, etc.

Table 9.—Use of various foods by 56 children less than 3 years of age in San Ysidro, Calif.[1]

Type of food	Number of children					
	Age (months)					
	Less than 6	6–12	13–18	19–24	25–36	Total
	(7)[2]	(7)	(9)	(12)	(21)	(56)
Milk:[3]						
Cow, homogenized	2	6	7	11	19	45
Cow, evaporated	1	2	2		2	7
Cow, nonfat				2		2
Human	1					1
Similac	2					2
Enfamil	1					1
Modilac with iron	1					1
Protein-rich foods:						
Eggs		4	5	11	16	36
Beef		1	1	6	8	16
Poultry (chicken)				2	6	8
Cheddar cheese			3	2	3	8
Fish			2		4	6
Beans, pinto		1		2	3	6
Strained meat w/vegetables		4				4
Luncheon meats			1		3	4
Pork				2	1	3
Strained meat			1	1	1	3
Peanut butter					1	1
Lentils				1		1
Bread and cereal:						
Cereal, dry	1		3	4	8	16
Potato, Irish		1	7	6	2	16
Rice		1	1	6	8	16
Infant cereals	5	6	2	1	1	15
Bread, white		2		4	8	14
Pasta				2	7	9
Tortillas, corn				3	4	7
Saltines			2	1	1	4
Tortillas, flour				1	3	4
Pancakes			1		2	3
Panes dulce			1		2	3
Cereal, cooked				1	1	2
Bread, banana					1	1
Fruit:						
Banana, fresh		1	1	2	7	11
Orange juice	1		3	1	2	7
Orange, fresh					4	4
Banana (G)[4]		1	2	1		4
Pears (G)		3				3
Applesauce (G)		2	1			3
Watermelon					2	2
Raisins				1	1	2
Pineapple juice				1	1	2
Peach, fresh					2	2
Fruit dessert (G)			2			2
Apples, fresh				2		2
Prunes (G)		1				1
Plums, fresh			1			1
Peaches, canned					1	1
Grapes		1				1
Grapefruit-pineapple juice				1		1
Fruit juice, mixed			1			1
Fruit, canned				1		1
Apricot-pineapple juice		1				1
Apricots, fresh			1			1
Applesauce and apricots (G)		1				1
Prunes					1	1
Vegetable:						
Vegetables, stewed		2		1	3	6
Tomato, fresh				1	5	
Tomato sauce				2	3	5
Tomato, canned				2	2	4
Vegetable soup		1	1		1	3
Celery			2	1		3
Lettuce				1	1	2
Radishes					1	1
Tomato juice		1				1
Mixed vegetables (G)		1				1
Mixed vegetables, frozen					1	1
Green salad					1	1
Carrots (G)		1				1
Carrots, fresh					1	1
Broccoli, frozen			1			1
Beans, green			1			1
Fat:						
Shortening		1	2	3	5	11
Butter			1	4	4	9
Lard				3	4	7
Margarine			3	3		6
Oil			1	2	3	6
Mayonnaise			1	1	3	5
Cream					2	2

[1] Data of Aranda et al. (unpublished).
[2] Numbers in parentheses indicate total number of children in each age group.
[3] Three children each received two types of milk.
[4] Gerber Products Company.

See footnotes at end of table.

Table 10.—Dietary supplementation of children less than 3 years of age in San Ysidro, Calif.[1]

	Number of children					
	Age (months)					
	Less than 6	6–12	13–18	19–24	25–36	Total
None	6	6	8	8	18	46
Vitamins	3	4	0	3	5	15
Iron	0	0	0	0	0	0
Vitamins & iron	2	0	4	3	9	18
Vitamins, iron, fluoride	0	0	0	0	1	1

[1] Data of Aranda et al. (unpublished).

Table 11.—Duration of breast or bottle feeding of 41 children of Mexican descent in East Los Angeles [1]

Duration of feeding (months)	Breast feeding	Bottle feeding
1	3	1
2		2
3	2	2
4		4
5	1	4
6		4
7	1	1
8		2
9	3	1
12	1	
18		1
24		1
Other [2]		7

[1] Data of Aranda et al. (unpublished).
[2] Duration not specified.

Table 12.—Food groups named as daily essentials by 35 Mexican-American women in Hanford, Calif.[1]

Food group	Number of times mentioned for:			
	Self	Pregnancy	Lactation	Child
Milk	22	22	18	23
Fruits and vegetables:				
Vitamin A rich	5	5	3	5
Vitamin C rich	6	8	4	6
Other	30	26	16	23
Meats	31	27	19	23
Breads and cereals	14	11	7	11

[1] Data of Bowden (20).

Table 13.—Foods suggested as "harmful" by 35 Mexican-American women in Hanford, Calif.[1]

Food item	Person to whom food is "harmful"				Number of times mentioned
	Self	Pregnant woman	Lactating woman	Child	
Chile peppers	x				2
		x			4
			x		3
Dried beans	x				2
		x			3
Pork		x			1
	x				2
"Sweets"		x			1
				x	1
Carbonated beverages		x			1
		x	x		1
			x	x	1
"Starchy" foods			x	x	1
		x			1
Apples, raw	x				1
Fish, fresh	x				1
Milk		x			1
Meat, raw	x				1
Bologna				x	1
Salt		x			1
Sugar		x			1
"Greasy food"		x			1
Chocolate			x		1
Spicy foods				x	1
Beets	x				1
Almonds				x	1
Rice, fried		x			1
Avocado			x		1

[1] Data of Bowden (20).

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Discussion

Miss Doris E. Lauber, Session Chairman: In my studies of several groups of Mexican-Americans in Phoenix and other areas of Maricopa County, Ariz. (carried out in 1960–63), I found no restriction on food during pregnancy. During the 6 weeks after birth (and also during menses), specific foods are taboo. Some foods are considered "hot" and "heavy"; others are classed as "cold" or "acid." None of the foods in these categories are permitted. Classification of these foods by some of the Maricopa County residents does not entirely conform to that reported in table 1 of the paper by Acosta and Aranda. For example, cabbage, cauliflower, chile peppers and chocolate are all considered "hot" foods. Peanut butter and eggs are both "hot" and "heavy." In addition, eggs are thought of as "gas-forming." "Cold" foods include citrus fruits, tomatoes, ice cream, gelatin dessert, dried peaches and apricots, strawberries, cheese, onions and garlic. Green beans are "cold," "gas-forming," and "acid."

Other foods forbidden but not considered especially "cold" or "hot" include pork, chorizo, bologna, candy, carbonated beverages, Kool-Aid, apples, dried beans, fish, and fried potatoes. Probably the one item most frequently eaten during the early postpartum period is a light soup. However, tomato soup is not permitted. Cereals, poultry, bread, crackers, coffee, tea, milk (if boiled), liver (if boiled), prunes, raisins, and potato chips are permitted. Pumpkin seeds are often dried, ground, and used in the preparation of a gruel that is considered especially desirable for lactation.

Many of the findings in San Ysidro pertaining to breast and bottle feeding are comparable to those found in Arizona. The number of women who breast feed their infants is not large. Evaporated milk is widely used even beyond the period of early infancy. Lack of refrigeration is often an important factor leading the mother to offer the older infant evaporated milk rather than whole milk.

Some interesting beliefs were reported by younger mothers in the Guadalupe area. Although some of these mothers do not believe wholeheartedly in many of the teachings pertaining to food and other health practices, mothers, mothers-in-law, and husbands often insist that they follow them: Orange and other fruit juices are considered "pretty fresh" for babies. Meats may not be given before 6 months; a raw egg may be given in the formula because a raw egg is easier to digest than a cooked egg and does not cause gas.

The first solids may be introduced at about 3 to 6 months. Infants are also fed broth from potato or macaroni sopas, or fried beans, mashed, and thinned with a little water. By 6 months of age, the baby is often given a beaten raw egg with added cinnamon and white or port wine because this is believed to give the baby a good appetite. As in San Ysidro, a very young infant may be given suera (sugar water) made with 6 oz. boiled water and ½ oz. Karo syrup.

Wild mint leaf is given for stomach ache, and cinnamon tea for colic. During the summer in the Guadalupe area, Brazil wood is purchased at the drugstore, scraped with a knife and placed in a bottle of water to soak for ½ to 1 hour. The water turns red; it is then sweetened and given to children 1 year of age and older to build blood.

By the time the infant is about 1 year old, he might be expected to eat the following: Meat soup, beans, oranges, bananas, and fruit juices. Babies are not permitted to eat strong vegetables such as cabbage, cauliflower, onions, garlic, tomatoes, chile, corn, or greens.

There is still a prevalent belief in mal ojo, a folk diagnosis in which sickness is caused in a child by someone who has the power to bring about this special illness. Praise or compliments may be sufficient to cause such illness. Thus, in child health clinics, workers need to understand that some mothers may be displeased when the staff pays too much attention to their infants or children.

A cause for great concern is a "low" fontanelle. Folk medicine doctors know how to cure a low fontanelle using the "eye of an egg and spit." There is also a belief that disease is often an expression of the will of God and that not much can be done about it.

Infants and children who "seem poorly" (fail

to thrive) are often considered to have empacho. Some of the mothers in Guadalupe reported that Anglo doctors did not know how to treat empacho, so they used their own witch doctors. Treatment may consist of tea or certain rituals. Certainly these beliefs have decided implications for health workers, who need to know them and give them due consideration if they expect to develop rapport with those they hope to serve.

In Arizona, as in San Ysidro, extended bottle feeding is practiced. The child may be 2½ to 3 years old before he is weaned. Very few children are given milk from a cup. Junior foods are rarely purchased. Too often, mothers are advised to stop breast feeding or bottle feeding without any consideration to whether or not appropriate food is available for the older infant, or to the beliefs and feelings of the mother and her family.

In low-income families, the basic diet usually consists of beans, chile, rice, and tortillas (mostly made of flour). Added to this may be fried potatoes, eggs, macaroni and spaghetti, sopas, Kool-Aid, canned soups (i.e., chicken noodle, chicken rice), and, when income permits, round steak prepared with tomato paste, onion, garlic, and oregano. The mother often buys canned soup for lunch. One can of soup may be diluted with two or three times as much water as specified. Along with the soup, Kool-Aid and "store" cookies may be given. Several fruits are well-liked but considered too expensive by most low-income families. Bananas, oranges, and grapefruit are all used when available.

Snack foods are popular and the well-known "snack wagons" find even the more remote streets. There are obviously many reasons behind the use of limited funds to purchase such items as ice cream bars, frozen ices, carbonated beverages, candy, and potato chips. Probably the greatest is the need to show love for the child, to give him something material, though rapidly consumable, that other children have. On a hot day, a bottle of soda may be the only cold beverage that the child has.

The nutritionists in a Maternity and Infant Care project in East Los Angeles have shared some of their findings. Kathleen Kerrigen reports that "about 76 of every 100 residents in East Los Angeles are Mexican-American. There is an island of poverty (8 square miles), where the median education, income, and standard of living of the population are the lowest in the health district, and the number of children per family is the highest—the median age is less than 20, median educational level less than fourth grade. With money matters, the man of the home is in complete charge." He is apt to do the grocery shopping or accompany his wife, particularly if they are recent immigrants.

About half of the mothers in the project express a desire to breast feed; however, the mothers are not encouraged to do so in the hospital following delivery and, in addition, the younger girls may return to school. As noted by Acosta and Aranda, bottle feeding is extended for 2 years or longer. According to Kerrigen, all foods may be fed by bottle until the infant is at least 1 year old—raw eggs, cereal, and commercially prepared strained foods being added to the milk or formula. It is also fairly common here, as it is in Arizona, to give the infants liquid jello water. The mothers seem to believe that it is a high protein food and very good for the baby. This conception may arise because it has been prescribed during certain illnesses.

In the five geographic areas discussed by Acosta and Aranda, and in Arizona, meat is not added to the infant's diet at an early age. However, neither is meat per se part of the routine daily diet of the older children and adults in low-income families. In Arizona, eggs constitute an important part of the diet of infants, children and adults. Kerrigen reports that the antepartal patients like raw eggs mixed in orange juice, and in Arizona, fried eggs for breakfast are popular, as well as huevos rancheros.

The mothers in Hanford, Calif.,[1] were all born in the United States, and it is not known what generation of Mexican-Americans they represent. My observations agree with those expressed in the final paragraph of the report by Acosta and Aranda. Certainly the beliefs are perpetuated by the barrio-type life styles, as well as the accessibility of the "homeland." Extended families continue to live in clusters, with the female members rarely communicating with "outsiders" and thus greatly influenced by the older women in the area. For instance, young expectant mothers in Phoenix were influenced to eat clay or dirt because it was thought to be good for them. In East Los Angeles, Kerrigen reports pica in many antepartal patients. Some of the items eaten include Mexican

[1] Bowden, S.: Nutritional Beliefs and Food Practices of Mexican-American Mothers. Thesis, Department of Home Economics, Fresno State College, Fresno, Calif., 1968.

clay pottery, ashes, carbonate of magnesium, and, less commonly, starch.

Miss Faustina Solis: Because opposing attitudes influence food habits, it is extremely difficult to generalize. For many people it is easier and less traumatic to relinquish language heritage than to give up food preferences. On the other hand, the impact of the dominant culture is a pervasive force. In many U.S. localities, various staples and herbs basic to traditional meal preparation are absent or expensive so that substitutions must be made. Children explore and observe the world about them and play a role as "interpreters of the community." They become familiar with foods of the dominant culture and cajole their parents into purchasing these foods. Thus, the interplay of many factors determines the rapidity and extent of changes in food patterns.

Although border populations of Mexican immigrants are generally believed to hold more tenaciously to cultural food habits than do other groups, I have noted a tendency toward experimentation with new foods. In fact, it sometimes seems that U.S.-born residents of Mexican descent are more selectively "Mexican" in their food habits than are immigrant Mexican families.

Parents who have known severe hunger are particularly inclined to feed their children often and abundantly if it is possible to do so. The chubby child is often considered healthy and the thin child is considered sickly. In addition, parents may find it impossible to deprive children of foods, even those that are not nutritionally sound. The quest for food has been such a major battle for many of these families in the past that they feel guilty if they deprive their children of food, particularly sweets.

Many Mexican-American families believe that fresh, home-prepared foods are preferable to other forms. It is therefore more acceptable to mash freshly prepared foods for feeding to infants and toddlers than to purchase commercially prepared strained foods.

As mentioned by Miss Lauber, "empacho" is a term frequently used to describe illness in the infant. It is significant that each Mexican family describes empacho differently. I never assume that I know the meaning of the term. When a person says the baby has empacho, I want to know how the mother thinks the baby feels and behaves.

For certain illnesses the common treatment in some areas of Mexico is to prohibit eating, almost as if "to starve out" the illness. When infants are ill, teas, atoles, rice water, and other liquids are fed, but no solid foods. The infant's digestive potential is considered to be yet undeveloped for certain foods. Bland foods such as rice, cereals, squash, cooked potato can be introduced but with caution to avoid "packing the stomach."

Miss Lauber: In working with some of the Mexican-Americans in Arizona I found that physicians instruct mothers to feed infants 7-Up during illness. Mothers often misunderstand and continue with this feeding after the child has recovered.

Mrs. Betty Lou Valentine: Directions for treating sick infants in our community often include feeding tea. Mothers think the child cannot survive on tea so they give milk and cereal in addition to or in place of the tea.

Dr. Thomas A. Anderson: The concept of hot and cold foods seems important to some Spanish-speaking groups in the United States and not at all important to others.

Mrs. Margarita Kay: Persons of Mexican descent in the Tucson area do not generally appear to be knowledgeable about classification of foods into categories of "hot" or "cold." However, other distinctions are made and these should be learned by professional health workers in each geographic area.

Mrs. Mary Ellen Wilcox: Many of the Spanish-speaking people in Florida migrated from Texas rather than from Mexico. They have been in contact with the dominant culture for some time. In my conversations with mothers, I find that a food is fed because it is thought to be good, or her mother used it, or it has been approved by the family. I found no reference to hot or cold. They may say a food is too heavy for an infant.

Dr. Acosta: I think the terminology has changed in recent years. When you look at some of the descriptions of foods, you may find that they fit into a frame of reference of hot or cold.

Dr. Virginia H. Young: The Hanford study reports that items common in the mother's diet were most frequently named as harmful foods. There also appeared to be little awareness of the value of breads and cereals. These are surprising findings, and one wonders if this is a case of denial of one's own food patterns or rejection of the question.

Dr. Acosta: Common everyday foods do not seem to have value in the minds of the family. When we asked mothers what was good for children, we found the bread class rated low.

Low-income groups in Hawaii

Infant and childhood feeding practices among low-income families in urban Hawaii

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The data to be reported here were compiled essentially from studies carried out during the last 5 years among families of low- or lower-middle income status in Honolulu, Hawaii. Low-income families are those which can qualify for food stamp assistance and for clinic services provided by the Hawaii State Department of Health. For the latter, incomes of less than $350 per month for a family of three qualified for well-baby clinics; the eligibility level increased by $50 for each additional child. This represents the maximum family income level designated as low-income status. A large number of families studied, however, earned less than the maximum allowable, and incomes were more similar to food stamp requirements.

BACKGROUND

The population of Hawaii comprises many diverse ethnic and cultural groups. According to the census of 1970, the population was roughly one-third Caucasian, one-third Japanese, 20 percent Hawaiian or part-Hawaiian, 6 percent Chinese, and 8 percent other groups (*1*). The last category includes persons of mixed heritage (excluding Hawaiian), Filipinos, and, other Polynesian, Oriental, and Pacific Island groups, many of whom have immigrated fairly recently to Hawaii. (The problems faced by these recent immigrants are similar, in general, to those of any immigrants from rural to urban settings but reflect, of course, the specific cultural patterns of the Hawaii immigrants.)

The low-income families from which our samples were drawn were not characteristic of the ethnic distribution of the population as a whole but comprised chiefly part-Hawaiian and "other" groups. The lower-middle-income families were chiefly part-Hawaiian and Japanese. However, although retained ethnic and cultural patterns influence to varying degree the food choices among older children and adults in Hawaii (*2–5*), in our experience, food practices among infants and very young children do not appear to be influenced significantly by ethnic or cultural background of the family.

INFANT FEEDING PRACTICES

As in other areas of the United States, breast feeding is less common than artificial feeding. In a sample of 281 infants of low- and lower-middle-income families, only 25 percent were completely breast-fed, and 11 percent were partly breast-fed (*6*). Sixty percent of the nursing mothers terminated breast feeding before the infant was 3 months old, and by 6 months of age, 80 percent of nursing mothers reported terminating breast feeding.

Fewer low-income mothers tend to breast feed their infants than do mothers of lower middle income (about one-fifth compared with one-third). It appears, however, that the mother's educational

level is an important factor influencing the choice of feeding method whereas income level per se is relatively unimportant. Our conclusions are supported by other studies. Guthrie (*7*), for example, has reported that nearly half of mothers interviewed in a university town breast-fed their infants and that breast feeding was favored by the better educated women.

The use of specially prepared infant formulas was more prevalent than might be expected among these lower income families, which also indicates a lack of influence of income per se in choice of infant feeding. In Honolulu, special formulas range in price from 10 cents to as much as 26 cents more per can than a can of evaporated milk. Roughly one-third to one-half of two survey samples (*6*, *9*) used special formulas for infant feeding. With the discontinuance of hospital formula rooms, most babies are started on special formulas in Honolulu hospitals. Mothers are provided with a small supply on leaving the hospital and probably simply assume the formula to be a preferred form of feeding. Many health workers also believe that special formulas are an infant "status" food. It has been our experience that this is possibly true and is perhaps one example of an indirect cultural influence on infant feeding. Among island cultural groups, infants are highly prized and receive very special care for the time that they are completely dependent upon their mothers. (The pattern often reverses when the child is able to walk and fend for himself.) An expensive formula is one way of providing this special care and love for the child.

Evaporated milk formulas are the other most commonly used form of milk. The feeding of fresh milk prior to 4 or 6 months of age is rare.

The amount of milk consumed by infants increases slightly from birth to 6 months of age and then declines by about three-quarters of previous intake as more solid foods are introduced into the infant's diet (*9*).

INTRODUCTION OF SOLID FOODS

The time at which solid foods are introduced into the infant's diet and the type of food introduced vary considerably. Among low-income families, it appears that mothers tend to follow the advice of relatives or friends to a greater extent than the advice of a physician or other professional health worker (*9*).

We obtained retrospective data from interviews of mothers of 2- and 3-year-old children and 3-day food records of infants attending well-baby clinics (*6*, *9*). The retrospective data are probably less reliable than the food records, but considered grossly, the two types of data provide some insight into the patterns of infant feeding among low-income families in Honolulu.

Although feeding of solid foods prior to the third month is common practice, feeding of cereals and occasionally other foods during the first month of an infant's life is relatively rare. However, by the second month of life roughly one-third to one-half of infants are getting foods other than milk. Cereals, fruit or fruit juice, and vegetable-meat combinations are most frequently given. By 6 months of age, meat and eggs are fed. Eggs, however, are used infrequently, and vegetable-meat combinations are more often used than meat alone. Commercial baby foods are used almost exclusively. In fact, low-income mothers appear to be influenced a great deal by advertising techniques, and in the Honolulu area one particular brand was used by all mothers in our sample. Infant foods with exotic names are frequently chosen in preference to simple food items.

The amount of food consumed varies considerably (table 1). Infants are usually fed on demand (crying), and relatively few low-income mothers follow a rigid feeding schedule.

Ethnic background apparently has little effect on early feeding pattern. However, we have noted that mothers of Hawaiian ancestry favor feeding poi and meat at a somewhat earlier age than mothers of other ethnic groups (*6*). Poi is a paste-like product prepared from taro and is a traditional Hawaiian food. It is commonly used as a substitute for cereals for potentially allergic infants, and many pediatricians favor poi as an infant cereal (*10*). While poi contains a fair amount of iron, it does not compare favorably with the enriched infant cereals in this nutrient. The use of poi in infant feeding is probably the only major difference between feeding practices in Hawaii and other areas of the United States.

We have no quantitative data on infant diets among middle- or upper-income families in Hawaii. However, retrospective data obtained by interview suggests that the general feeding pattern for infants is similar at least between low-income and lower-middle-income families. Among children 2 to 3 years old, however, we have found that diets of low-income children contain less milk and

more cereal grains than those of children of lower-middle-income families. Consumption of eggs, green and yellow vegetables, and citrus fruits tend to be relatively low among both low-income and lower-middle-income children (*8*).

Since 2- and 3-year-old children share the family table, they consume ethnic foods to some degree. As has been observed by Wenkam (*2*), breakfast and lunch usually consist of conventional American foods and dishes, and ethnic foods may be used for dinner (evening meal) or as snacks. Soy sauce and soybean curd (tofu) are widely used in cooked dishes as well as snack foods. Combinations of vegetables and meat are common among all ethnic groups. The ingredients used in these mixed dishes vary considerably in kind and amount and present real problems in diet calculations. Certain oriental snack foods such as preserved seeds, sushi, dried squid, and various meat, vegetable, and dough mixtures are popular. Many of these foods are introduced by the sixth month of life. The consumption of these food items is not confined to any specific ethnic group. They are readily available and are enjoyed by many groups. Beyond infancy, however, poi remains most widely consumed by families of Hawaiian ancestry. Unfortunately, the availability of poi has decreased steadily with urbanization, and its price has increased to about 20 cents for a half cup. Poi, therefore, is an expensive food item.

VITAMIN AND MINERAL SUPPLEMENTATION

Routine daily vitamin supplementation is virtually nil. In our experience, few low-income mothers in Honolulu actually follow instructions in giving prescribed supplements. Roughly 50 percent of our sample of infants under 1 year of age and 34 percent of children 2 to 3 years of age ostensibly were taking vitamins, but few were given the supplements daily and some apparently never received the supplement. The decision to supplement appears to be an arbitrary judgment unrelated to the child's needs (*11*) and is made by the mother or relative as often as on the advice of a physician.

Iron-containing supplements are given less often than vitamins, although the need for iron appears to be greater. We found that roughly 4 percent of a sample of low-income children 2 to 3 years of age had hemoglobin levels below 10 gm. per 100 ml., but only 1 percent of hematocrit levels were below 30 percent (*8*). The incidence of anemia, thus, is somewhat lower than that reported for some low-income populations on the mainland (*12*). However, although exact figures are not available from well-baby clinic records, the incidence of anemia among infants under 1 year of age in Honolulu is believed to be higher than we have found for children 2 and 3 years of age.

NUTRIENT INTAKES

Mean nutrient intakes were derived for infants and for children 2 and 3 years of age from 3-day food records (table 2). The NRC recommended allowances are shown in table 2 for purposes of gross comparison. The ranges of intakes emphasize the extreme variation among individual children.

With the exception of iron, nutrient intakes of infants compare favorably with the recommended allowances and often are well above recommended levels. On the whole, infants appear to be somewhat better fed than the 2- and 3-year-old children in our samples. These differences may be due to the vagaries of the behavior patterns of 2- and 3-year-old children, but also may be due to the greater choice allowed to the young child, who often selects snack foods of relatively low nutrient value.

Income class (and associated socioeconomic factors) apparently affects nutrient intake to some degree. Calcium, riboflavin, and ascorbic acid intakes were found to be lower for low-income children than have been reported for children of lower-middle-income status (*8*). The difference is due apparently to lower consumption of milk and citrus products. Low vitamin A intake also appears to be more common among low-income children.

Of the ethnic groups studied, the part-Hawaiian and Japanese samples were large enough to permit comparisons of nutrient intakes. Unfortunately only the lower-middle-income groups are represented, since only one Japanese family in our sample was classed as low-income. The data on nutrient intakes of low-income and lower-middle-income Hawaiian children, and lower-middle-income Japanese children are shown in table 3. Energy, iron, and niacin intakes of Hawaiian children tend to be higher than those of Japanese children. Energy and ascorbic acid intakes are lower among low-income Hawaiian children than among middle-income Hawaiian children.

We are reluctant to speculate on the significance of these trends, but differences in caloric intake

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are possibly related to differences in size. Hawaiian children are taller and heavier than Japanese children (*13*). Energy intakes of low-income Hawaiian children, however, were more similar to those of the smaller Japanese children. Whether these differences persist into later life and could ultimately affect growth is uncertain.

SUMMARY

The data presented here were compiled from surveys carried out during the last five years on two sample groups in the city of Honolulu. Artificial feeding was favored over breast feeding by a large majority of low-income mothers. Specially prepared infant formulas were used by one-third of sample groups; evaporated milk formulas were the other most common form of milk feeding. By the second month of life roughly one-third to one-half of infants were fed some form of solid food, chiefly cereals, fruit or fruit juice, and vegetable-meat combinations. The amount of milk consumed by infants increased from birth to 6 months of age and then declined as more solid foods were introduced into the infant's diet. Commercially prepared infant foods were used almost exclusively. Children 2 to 3 years old appear to be less well fed than infants under 1 year of age, but there was little evidence of serious malnutrition. Diets of low-income children 2 to 3 years of age contained less milk and citrus products and more cereal grains than has been reported for children of slightly higher income families in Honolulu. Accordingly, calcium, riboflavin, and ascorbic intakes tend to be lower.

Table 1.—Food intake according to infants' ages

Food	Under 2 months			2 to 3 months			4 to 6 months			Over 6 months		
	Number of infants	Average intake	Range	Number of infants	Average intake	Range	Number of infants	Average intake	Range	Number of infants	Average intake	Range
Milk (oz.)	4	27.7	14.7 -36.5	10	29.4	18.0-40. 2	18	31.9	15.5 -67.3	20	24.8	8.0 -38.5
Dry cereal (oz.)	2	.1	.08- .19	4	.4	.17- . 27	9	.7	.17- 2.3	13	.30	.08- 1.0
Eggs (number)	0			0			2	1.0	.33- .66	3	.90	.33- 1.0
Fruit (oz.)	0			7	3.7	.9 -9. 4	13	5.1	.77-12.5	16	3.3	.17-12.7
Fruit juice (oz.)	0			6	3.7	1.3 -7. 9	11	4.7	.50-16.0	15	4.3	.66-15.0
Vegetable (oz.)	0			4	1.4	17-2. 4	9	2.6	.33- 5.2	11	2.3	.22- 6.2
Vegetable/meat (oz.)	0			5	2.0	.17-2. 4	16	5.4	.33-11.3	18	4.9	.33-15.0
Meat (oz.)	0			1	2.3		6	1.5	.27- 3.5	12	1.3	.33- 2.3
Prepared cereal (oz.)	0			3	2.5	1.3 -4.6	6	3.4	1.0 - 7.8	17	1.9	.33- 4.7
Custard pudding (oz.)	0			2	2.5	1.5 -3.4	3	2.5	1.5 - 4.5	7	1.3	.5 - 2.3
Poi (oz.)	0			0			4	1.6	.5 - 2.7	3	1.8	1.2 - 2.2
Bread products (oz.)	0			0						10	.6	.19- 1.8

Table 2.—Nutrient intakes of infants and young children derived from 3-day food records

	Under 4 months (N=14)		4-6 months (N=13)		7-9 months (N=20)		2 years (N=65)		3 years (N=82)	
	Intake	RDA	Intake	RDA	Intake	RDA	Intake	RDA	Intake	RDA
Energy (kcal.)	725	480	983	770	890	900	1,186	1,250	1,386	1,400
Range	343-1,196		526-1,673		638-1,405		470-2,586		569-2,714	
Protein (gm.)	25.5	8	35.3	14	33.8	16	46.6	25	51.6	30
Range	9.8-44.3		10.2-74.2		14.6-63.2		17.5-86.1		20.6-110.3	
Calcium (mg.)	897	500	1,085	500	.973	600	602	800	631	800
Range	380-1,529		364-2,389		404-2,464		115-1,573		178-1,680	
Iron (mg.)	5.1	10	10.0	10	8.9	15	6.3	15	7.6	10
Range	.4-14.2		.4-35.8		2.5-19.1		2.3-17.4		3.0-25.4	
Vitamin A (I.U.)	2,539	1,500	5,537	1,500	4,390	1,500	2,510	2,000	3,000	2,000
Range	338-8,559		1,641-30,900		842-9,544		220-10,580		410-15,420	
Thiamin (mg.)	.47	.4	.71	.4	.60	.5	.58	.6	.68	.7
Range	.10-1.40		.32-2.22		.23-1.09		.19-1.54		.23-1.66	
Riboflavin (mg.)	1.40	.5	2.81	.5	1.60	.60	1.15	.7	1.22	.8
Range	.62-2.58		.61-3.99		.76-2.90		.38-2.59		.38-2.97	
Niacin (mg.)	3.4	[1]7	5.9	7	6.0	8	7.7	8	8.7	9
Range	.7-9.4		2.1-13.4		2.0-8.6		2.8-20.6		3.3-16.9	
Ascorbic acid (mg.)	44	35	57	35	77	35	33	40	42	40
Range	2-134		14.0-170		10-433		3-110		1-180	

[1] mg. equivalents.

Table 3.—Nutrient intakes of Hawaiian and Japanese children, 2 and 3 years of age

	Hawaiian				Japanese	
	Low income (N=76)		Middle income (N=42)		Middle income (N=60)	
	Mean	S.D.[1]	Mean	S.D.	Mean	S.D.
Energy (kcal.)	1,343	481	[2]1,516	674	[2]1,217	393
Protein (gm.)	50.4	22.2	55.0	20.2	46.2	17.9
Calcium (mg.)	615	390	742	398	733	365
Iron (mg.)	7.3	4.2	[3]7.5	3.5	[3]5.9	3.9
Vitamin A (I.U.)	2,730	2,990	3,290	2,320	2,960	2,830
Thiamin (mg.)	.64	.34	.73	.31	.61	.29
Riboflavin (mg.)	1.18	.63	1.40	.63	1.27	.58
Niacin (mg.)	8.1	4.6	[3]8.9	4.3	[3]6.9	3.5
Ascorbic acid (mg.)	39	44	58	77	[3]59	52

[1] Standard deviation.
[2] Significant at 2% level.
[3] Significant at 5% level.

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Discussion

Miss Doris E. Lauber, Session Chairman: Information pertaining to feeding practices of infants and preschool children in Hawaii has been obtained by the nutrition staff and other health personnel employed in Maternity and Infant Care and Children and Youth projects. In particular, I should like to thank Mrs. Flora Thong; Mrs. Clara Tamura; Miss Alma Tanaka; and Mrs. Carole Ito, Hawaii Department of Health, for sharing their findings and observations with us in writing. I shall quote verbatim from their reports. The findings are similar to those reported by Brown and Ho. The "typical" project patient is non-Caucasian, nonwhite, and low-income.

Infants are seldom breast-fed. As noted by Brown and Ho, those mothers who do breast feed often discontinue this mode of feeding by the time the infant is 2 months of age.

Commercially prepared formulas are given to the mothers when they and their infants are discharged from the hospital, but some of the women feed evaporated milk formulas after discharge.

Despite recommendations to the contrary by physicians, nurses, and others, many mothers feed cereals and strained fruits and vegetables to their babies during the first 4 weeks of life. Mothers state that their babies are not satisfied with only the formula. Infant cereals and strained fruits and vegetables usually are mixed with the formula in the amount of about 1 tablespoon per bottle. Most babies are not held when fed. Mothers report that they are too busy.

In an unpublished study of 40 high-risk infants, Mrs. Tamura found that 33 infants were initially fed commercially prepared formulas (only one with iron), six were fed evaporated milk, and one a soybean-based formula. By 1 month of age, cereal was being fed to 29 infants (rice cereal to 28); poi was fed to three; strained vegetables to seven; strained fruit to two; strained desserts to two; fruit juices to two; and vegetable-meat dinner to one. Seventy-two percent of infants were fed some form of solid food during the second month of life, a larger percentage than the 33 to 50 percent reported by Brown and Ho. Both studies certainly confirm the current tendency toward early introduction of solids despite the added cost and lack of professional advocacy.

As on the mainland, there seems to be some unexplained status connected with early introduction of most infant foods. By 2 or 3 months of age, infants are fed all varieties of infant cereals, puddings, fruits, juices, vegetables, and vegetable-meat dinners. As reported by Brown and Ho, strained meats and either canned or fresh egg yolks are not commonly fed. Eggs are thought to cause "rash" and strained meats are considered too expensive.

The typical Hawaiian diet, including cooked fish, raw fish or seafoods, seaweed, coconut, etc., is seldom fed to infants. Poi is an exception. By 1 to 2 months of age, 1 or 2 tablespoons of fresh poi is frequently added to the formula. Commercially prepared strained infant foods are preferred to home-prepared foods because of status and convenience.

For most infants, bottle feeding continues through the first year of life and it is not uncommon to find 2-year-old children still taking milk from a bottle. Commercially prepared formulas are usually discontinued between 2 and 6 months of age, and the infant is then usually given an evaporated milk formula, and later, whole milk.

Infants are fed strained baby foods and then table foods; junior foods are seldom used. Between 3 and 4 months of age most infants are introduced to table foods—rice, gravy, canned soups and meats, bread and crackers. In Tamura's study of high-risk infants, 12 were eating some table food by 6 months of age. Although all 27 who had attained the age of 12 months were eating table foods, only two infants had been given junior foods. She listed commonly used table foods as bread, carrots, potatoes, rice, chicken, beef, stews, corn, peas, spinach, canned soups, scrambled or boiled eggs (although only 10 of 27 reported using eggs), crackers, Vienna sausage, raw fish, ice cream, fish, luau leaves, and pumpkin. The absence

of fruit as well as cereals from this list should be noted. Papayas and bananas are seldom fed since they are not home-grown and are considered expensive.

In the study by Brown and Ho, as well as in a study of intake and dietary practices in the Waimanalo Children and Youth project, the changes in nutrient intakes are reflected in feeding practices. Ascorbic acid intakes are low in preschool children despite the fact that guavas are plentiful and are an excellent source. Guavas are sold for commercial use for needed cash by many families. Few families grow their own papaya, though this fruit, too, is an excellent source of vitamin C.

Kool-Aid, carbonated beverages, coffee, and tea may be given between 6 months and 1 year of age. Orange drinks, orange base, or punch syrup diluted with water is often put in bottles and fed as "juice."

Intake of sweets and carbohydrates by preschool children is generally found to be high. Rice is a popular food, and diluted canned soup served with a quantity of rice is considered to be an adequate or acceptable meal by many families.

Patterns of infant feeding or of preschool food choices seem to vary little from one part of Oahu to another. There are wide choices of foods, and there is certainly an amalgamation of ethnic food patterns.

Dr. Mary Murai: On the basis of observations made during 15 years of working and living in Hawaii and from subsequent frequent visits, I want to emphasize the point made by Brown and Ho that their findings cannot be generalized to other ethnic groups, of which there are many in Hawaii. Some of the other ethnic groups may not acculturate as rapidly as the Hawaiians. The conclusion, "Food practices among infants and very young children do not appear to be influenced significantly by ethnic or cultural background of the family," is undoubtedly true; however, even within these groups the degree of acculturation varies. The great amount of travel between and immigration from the countries of origin of some of the Asiatic groups continually reinforces beliefs and customs. I have been struck by the increase in number of Japanese foodshops which are branches of shops located in Japan. Culture, customs, traditions, and folklore persist in varying degrees.

Infant feeding practices can probably be adapted by some subcultures more easily than others. There are a number of beliefs on appropriate foods for lactating women. In the Chinese group, pig's feet with ginger is a traditional dish given to mothers soon after they give birth. Pig's feet with ginger and a high concentration of vinegar are cooked for a long time at very low temperatures. This dish is probably high in calcium and phosphorus. Salted or fermented fish and salted duck eggs are also traditional dishes allowed the nursing woman during the first months of lactation. It was almost standard practice for families to bring this special food to the hospital for the mother after birth of an infant and was permitted by the professional staff. The Japanese favor miso soup (soup made with soybean paste) for greater breast milk production. The Koreans give seaweed and clam soup to nursing mothers.

In the past there was great emphasis on lactation; breast feeding was prized as a necessity for a healthy child. No doubt these beliefs and practices no longer apply to the majority, but such beliefs are still existent. If grandparents, who are strong believers, are the decisionmakers and power wielding members of the family group, these practices are likely to persist in the family group.

Beliefs of the dominant culture are intertwined with customs and beliefs of subcultures. In different periods in the life cycle, one set of beliefs may dominate over the other, depending on how deeply these are ingrained and the state of acculturation of the population group.

Brown and Ho noted that mothers of Hawaiian ancestry favor feeding poi and meat at a somewhat earlier age than mothers of other ethnic groups. I have noted that Chinese and Japanese mothers give rice gruel or soft rice (rice cooked with large amounts of water) and soybean curds earlier than mothers of other ethnic groups. Soybean curd is made from soybean milk by precipitating the protein with calcium or magnesium salts and pressing it into cakes. This product has an iron content of 1.5 mg. per 100 grams and very little crude fiber, and the protein has a very high coefficient of digestibility. It is usually given fresh or cooked and is bland in taste.

As the child reaches 2 or 3 years of age, his diet becomes a mixture of Caucasian, Chinese, Japanese, Hawaiian, and other ethnic foods. As stated by the authors, poi remains most widely consumed by families of Hawaiian ancestry, and rice is widely consumed by other groups, who consider it their most important staple.

Dr. Brown: I would like to raise a few ques-

tions that seem relevant. First, are those families who visit a clinic typical of the entire low-income population, or do they represent the most motivated families? Second, in our studies of almost 300 children, we had a 30-percent cooperation rate, which meant we learned nothing about 70 percent of the people. I wonder what these 70 percent are like. Did we get the right people in our sample? Can the people we examined tell us what we really need to know?

Miss Lauber: According to regulations of the welfare program in Hawaii, if a woman comes for prenatal care and is certified to be pregnant, she receives an increase in food allowance. This serves as an incentive to come for prenatal care and, once in the clinic, patients are counseled on the importance of good nutritional practices.

Dr. Brown: Attitudes of mothers toward their infants in Hawaii are such that income exerts relatively little influence on feeding practices. Income begins to make a difference in the nourishment of the child beyond 1 year of age.

Miss Mary Lynch: Do you think that use of expensive foods for the infant less than 1 year of age places a strain on the family budget that makes it unduly difficult to provide adequate food for other family members?

Dr. Brown: The low-income families average about six members. What the costs of infant formula and strained foods do to the budget, I don't know.

Dr. Ogden Johnson: Is there a greater use of fruit juice and fruit products among children in the 2- to 4-year-old age group in Hawaii than in the other parts of the United States?

Dr. Brown: No. Fruit drinks seem to be used more than fruit juices. In our studies, 25 to 30 percent of the dietary ascorbic acid came from tomatoes and citrus fruits and 50 percent from other fruits. Many families used drinks which were fairly low in ascorbic acid. Pineapple is not popular in Hawaii. Practically everybody who has lived in Hawaii all his life has at one time or another worked in a pineapple factory. If you work in a pineapple factory all day, you do not want to eat pineapple. It is the least popular fruit, at least among college students. Popular fruits are apples, bananas, and oranges. Neither papaya nor pineapple is popular.

Miss Catherine Cowell: A number of pediatricians in New York City advise against feeding orange juice before 9 or 10 months of age. They claim there is a high incidence of asthma and similar diseases among black children and are reluctant to have mothers feed any kind of fruit juice, particularly orange juice, to the young infant.

Dr. Brown: I know that some pediatricians in Hawaii also hold this view, but I do not know how general it is. However, the advice of the pediatrician is often not followed.

Dr. George M. Owen: Pediatricians are aware that their advice is often not followed. However, I would guess that orange juice is less commonly fed to infants today than was the case 25 years ago.

Mrs. Mary Ellen Wilcox: We provide vitamin and iron supplements in our clinics, and our guidelines recommend that orange juice not be fed until 6 months of age. However, most of the mothers have introduced it by the time the baby is brought in at 4 or 5 weeks of age.

Miss Lauber: Many physicians working in the clinics that serve these low-income families in Hawaii do not believe in the efficacy of iron-fortified formulas and therefore do not recommend that mothers feed them. If the Academy of Pediatrics' recommendation[1] is accepted, this practice may change in the near future. One is reminded when visiting some of the prenatal clinics or well-baby clinics in Hawaii that there is no typical Hawaiian. One might see a part-Hawaiian, part-Japanese, or part-Filipino who has adopted some of the food patterns from each of these and many other cultures.

Dr. Brown: We found that mothers are given free iron supplements in the clinic but for the most part do not use them. A few give medicinal iron regularly to their infants but many use it infrequently or not at all.

Dr. Murai: The comments of Mrs. Marjorie Abel, chief nutritionist for the State of Hawaii, are of interest. She agrees with Brown and Ho that the ethnic backgrounds of low-income groups are mainly "part-Hawaiian," Samoan, and Filipino. She emphasizes that family relationships are changing rapidly in Hawaii. Even among the Chinese and Japanese, who traditionally honor the elderly, older people are now often placed in nursing homes. The influence of older persons in the practices of the young is sharply reduced. Thirty years ago, families gave infants exactly what was ordered by physicians, even if this meant depriv-

[1] Committee on Nutrition, American Academy of Pediatrics: Committee statement: Iron-fortified formulas. Evanston, Ill., December 15, 1970.

ing the rest of the family. Now, they are inclined to anticipate the physician—to begin feeding strained foods and table foods earlier than is recommended. A traditional idea is that a fat baby is a healthy baby and one who reflects the family's economic status. Early introduction of various foods is believed to make the infant healthy.

Mrs. Abel says that whereas 20 years ago about 90 percent of infants received evaporated milk formulas, now nearly all receive commercially prepared formulas. The principal argument by physicians is the need for iron, but I wonder how many mothers actually buy the iron-fortified formulas.

Claire Ho has recently talked with persons at the Kapiolani Hospital, including the dietitian. They report that the most recent immigrant group with significant problems in infant nutrition are the Samoans. The influx of Asiatic groups is insignificant and their infiuence on their Hawaiian counterparts is nil.

Dr. Phyllis B. Acosta: In PKU clinics we had established a rule that we would not add any solid foods to the infant's diet until 3 months of age. It is very difficult to keep mothers from adding solids because it has become a status symbol. If the next door neighbor's infant is eating cereal and yours is not, there must be something wrong. The biggest problem we have had in managing PKU infants is keeping solid food out of the diet until 3 months of age.

Dr. Brown: The physician may not want mothers to feed solid food as early as they do, but in our experience he doesn't really discourage them from doing so. Because it makes the mother happy to feed the baby early, the assumption is that if the mother is happy, the baby is happy. Mothers seem to think that if the baby gets more to eat, he will sleep through the night. In recent years we are finding more overweight children, suggesting that many mothers may be overfeeding their children throughout childhood.

Dr. Samuel J. Fomon: If a normal infant receives an adequate (and not excessive) intake of calories and of every essential nutrient, it really is of no nutritional significance whether the nutrients are provided solely from formula or partly from formula and partly from other foods. Early introduction of strained foods may have important psychological, social and economic implications, but the nutritional consequences seem insignificant unless poor food choices are made.

Indian and Alaska native low-income groups

Infant and child feeding practices among low-income reservation and rural American Indian and Alaska Native* families

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INTRODUCTION

The material presented was assembled from reports of Indian Health Service public health nutritionists and a dietary consultant. Since there are limited data on dietary intakes of infants and preschool children, the statements are primarily impressions drawn from observations and personal experiences. The exceptions which are reported separately are surveys by Dr. Christine Heller, Arctic Health Research Center; the Nutrition Survey of White Mountain Apache Preschool Children by Dr. George M. Owen with participation of Indian Health Service nutritionists; and limited data on this age group from the Montana (Blackfeet and Fort Belknap Reservations) and the Lower Greasewood (Navajo) Nutrition Surveys conducted by Dr. Arnold E. Schaefer et al. and the Indian Health Service.

Due to the transitions in Indian society, traditional food practices based on hunting, fishing and food gathering have greatly diminished. Most families now depend on local grocery stores, reservation trading posts and commodity foods (where this program exists) for their principal food supplies. The extent to which traditional practices are prevalent varies also with local availability of wild game, fish, wild fowl, berries and roots. Seasonally, certain of these foods make important contributions to the family food intake.

Other factors which are influencing feeding practices are housing improvements, economic status, employment of mothers, available transportation, Federal food assistance programs, proximity to food markets, physical and mental health status, and degree of knowledge of the importance of food to health.

The permissiveness of mothers is highlighted in reports from Indian Health Service nutritionists:

> Perhaps the practice which has the greatest influence on what the Indian child eats is a part of the Indian culture which recognizes each child as an individual. Therefore, the child by 2 years of age may eat when he's hungry, eat what he likes and what is available. The adult tends to keep the kinds of foods the child likes best and those which are convenient for him to eat when he's hungry.
>
> Mothers and grandmothers are very permissive with children about food. They let children, regardless of age, choose the food they want at whatever time they want to eat.
>
> Some mothers have little understanding of differences in foods or of a child's nutritive needs other than calories. Candy and soft drinks may seem as essential to them as meat and vegetables.

An example was given of a mother ordering a preschool child to share candy with an infant.

Another factor affecting food habits and nutritional status is family disorganization and the increasing numbers of infants and children receiving care outside the family. The resulting emotional stresses and interrelationships have received slight documentation in terms of nutritional status.

*Eskimos, Indians, and Aleuts.

BREAST AND FORMULA FEEDING

Feeding practices of infants and preschool children are gradually changing, with no set pattern predominating. Breast feeding varies with degree of acculturation. The working mother tends to bottle feed her baby. Breast feeding increases where job opportunities are not available to the young women.

Information from the Lower Greasewood (Navajo) Nutrition Survey (*1*) indicates that "of 108 children, half were bottle fed from birth. Those that were breast fed, were breast fed to 3 months of age."

In the Oklahoma City Indian Health Service Area (primarily Oklahoma, Mississippi, and North Carolina) infants are apt to be sent home from the hospital on a proprietary formula containing iron, as ordered by the physician, but this may be discontinued very soon in favor of the less expensive evaporated milk. This may be a "filled milk" called "Milnot" which costs less than the usual evaporated milk. Proprietary formulas are not always available in rural stores or trading posts where Indians shop for groceries.

Reports by Heller and Scott (*2*) concerning 555 diet records for Eskimo and Athapascan babies 24 months of age and under in 11 Alaska Native villages noted 282 of these dietaries were for formula-fed infants. Breast feeding was common for infants 2 months of age and younger, but after this age, formula feeding was the more common practice. Breast feeding was the sole source of milk in about 50 percent of the records for infants under 4 months of age, and a partial source for an additional 25 percent. By 4 to 7 months of age, less than 30 percent were being entirely breast fed and about an equal number were partially breast fed. By 8 to 12 months, less than 20 percent were entirely breast fed. Almost 66 percent of these infants were fed entirely by formula. Trends in a 10-year period in breast and formula feeding are shown in unpublished data gathered by the Arctic Health Research Center (*3*), Tables I–II. Information about milk feeding practices and solid food supplementation was obtained by nurses who visited an average of three times in the home of each infant. In 27 small Alaska Native villages 282 infants were included in the 1960–62 study. In 10 of these same villages and Bethel (2,000 estimated population in 1969), 249 infants were included in the second study in 1968–70.

In the villages the incidence of breast feeding in the first month declined from 53 percent in 1960–62 to 33 percent in 1968–70. Only 3 percent of Bethel infants were breast fed during the first month. In the 1960–62 study, by 6–9 months of age formula was the sole source of milk for 40 percent of infants and breast feeding, for 25 percent. Seventy percent of village infants (6–9 months) and 82 percent of infants in Bethel were receiving formula feeding entirely by 1968.

In both studies, canned evaporated milk was almost always the formula fed to infants. Only one village infant received a commercial formula.

The decline in breast feeding is greater among Indian groups where other milk supplies are readily available. The use of proprietary formulas when the infant leaves the hospital has increased due to free discharge packs and prescriptions by physicians. A study of records in the Blackfeet Indian Health Service Hospital (Montana) found only 10 percent of newborn infants who were breast fed on discharge. Families who cannot afford to buy the proprietary formulas often switch to evaporated milk, which is available as a commodity food.

The Indian Health Service dietary consultant for the IHS Navajo Area and Albuquerque Area (Navajo and Pueblo Tribes) reports that bottle feeding may be of evaporated milk, proprietary formulas, or commercially prepared ready-to-use formulas. Goat's milk may be used when available. Soft drinks, Kool-Aid, powdered orange-flavored drinks (such as Tang), coffee and tea are frequently used in bottle feedings. About 10 percent of Indian children in one Head Start program had not been weaned from the bottle. The same problem is found with this age group in hospitalized Indian children.

Continuation of bottle feedings well beyond infancy has also been reported among several other Indian and Alaska Native groups. Heller believes that among the Eskimos, this practice is carried over from early practices of continuing breast feeding up to 3 or even to 5 years of age. While only three records in her study of 555 infant records show children being breast fed beyond 24 months of age, 105 records show children over 2 years of age still receiving part of their milk from the bottle. Most of these children were receiving family diets, and the formula was usually given in the late evening or early morning and thus may have served only as a pacifier (*2*).

ADDITION OF SOLID FOODS

Late introduction of solid foods, as well as very early supplements, has been reported by several Indian Health Service nutritionists. Solid foods for infants in the Oklahoma City IHS Area have been reported to be started within a week after birth or delayed for several months. First solid food is frequently gravy made from drippings and flour, sometimes with milk added. Table food may be started quite early. Depending upon economy, the family diet is likely to be high in carbohydrate and in fat, limited in good quality protein, and short in sources of vitamin C and iron, at least. Few children are brought into clinics after the first year or two, except for illness. Public health nurses report that infants may be taken off milk, and have "pop" substituted, before the end of the first year. Cookies and candy are often preferred over other solid foods and a high degree of permissiveness is usual.

Although nutritionists in the Indian Health Service, Oklahoma City Area, caution against generalizations, some general trends were observed. Lean meat is seldom used. Salt pork and bacon are used by almost everyone, as are eggs in either fresh or dried form. Dried beans are found in nearly all diets and serve as the basis for the diets of the very poor. Vegetables are seldom used and fruits, even more infrequently, or not at all. Milk is not consumed in any quantity as a beverage, but is added to home-prepared bread by many families. Bread in one form or another is used by everyone.

Table food for North Carolina Cherokee babies is apt to be poorly selected. Family food contains rather large amounts of fat and carbohydrate.

In the Portland Indian Health Service Area (Oregon, Washington, Idaho), "pure" foods are frequently the first, other than milk, given to the infant. These foods are picked by the mother and prepared especially for the child. Crushed huckleberry was used to break in each child in one family. Other foods reportedly used for this purpose are roots, salmon, dried eel, meat, chokecherries and blueberries—often referred to as Indian foods.

In the Navajo and Albuquerque Indian Health Services Areas (principally Arizona and New Mexico), late introduction of solid foods poses a big problem. Very often these foods are not introduced before 1 year, or even up to 3 years. Family foods introduced first might be broth from stew, mashed vegetables from stew, fried potatoes, tortillas, pinto beans, and/or soup from the beans. Coffee and tea are introduced at an early age. Coffee, however, usually has added milk and sugar.

Solid foods are sometimes introduced on demand by the older baby, who might be sitting on the mother's lap while the mother is eating. The child may accept or reject the food the mother offers him.

If available, a selected lamb bone is provided for teething. Corn and potato chips are also offered and used for teething. The late introduction of solid foods and failure to learn to chew have been quite noticeable among Indian children in Head Start programs which now have 3-year olds. This same problem is found in hospitalized Indian preschool children.

After weaning, milk consumption may be greatly reduced in order to provide milk for a newborn or to be shared with other family members. The belief that milk is only for babies also reduces the consumption.

The 1961–62 Montana Nutrition Surveys (4) conducted on the Blackfeet and Fort Belknap Indian Reservations by the Interdepartmental Committee on Nutrition for National Defense in cooperation with the Indian Health Service and the tribal governments included a sample of children ages 0–5 years. Dietary intakes of this age group were not published; therefore, the family food intakes are discussed as an index of nutrients available.

Calories and protein were provided in abundance for the majority of families studied in both seasons (fall and spring). Foods providing vitamin A or carotene and ascorbic acid were used less frequently. Fruits were well liked, but more canned fruits than fresh or citrus type were reported. Calcium and riboflavin were in short supply. There were inadequate intakes of iodine and fluoride and excesses of concentrated sweets.

Family diets were high in meats, starches, sweets and fats, and low in milk, fruits and vegetables. The degree of iron-deficiency anemia in this age group is uncertain due to the small sample size of 39 children with biochemical assessments.

The traditional basic diet of the Indian people in the Billings IHS Area (Montana and Wyoming) was meat—principally buffalo, deer, elk and antelope. All edible parts of the animal were eaten. This custom still prevails among families who raise cattle or hunt wild game. Some families

have a supply of dried or frozen wild berries and continue to prepare dried meats. Generally the response to usage of traditional foods is, "Where can I get it?," indicating that supplies on hand are insufficient.

Physicians and nurses in Billings Area Indian Health Service facilities have reported that families who start solid foods early tend to feed them all at once rather than by gradual introduction. There are other cases of withholding solid foods until late in the first year. There are still many hospitalized infants who have to be taught to eat from a spoon. Young mothers are more apt to use canned baby foods if money is available. An indicator of usage of these items is the supply of baby foods on hand in small reservation stores. Evaporated milk (also used by the family), infant cereals, vegetables, fruits, puddings, juices, and junior dinners are often available. Proprietary formulas, meats and eggs for infants are not generally stocked.

Families who feed table foods to infants have reported using mashed potatoes and gravy, soup or stew with mashed vegetables, and juices. The infant may be given a large piece of meat to chew on. A mother reported, "he held it and chewed until it was white, with no meat left."

Public health nurses report a low milk intake after infancy. Commodity nonfat dry milk is poorly utilized due to problems in reliquefying the spray-dried product. The instant type has not been available as a commodity.

ALASKA STUDIES

Maynard, in a study of growth, morbidity and mortality among 643 Eskimo infants of Western Alaska (*5*), noted that weight curves for Eskimo male and female infants did not differ markedly from the Falkner standards for North American Caucasian children. Height in both Eskimo males and females began to lag by the second month of life. By the end of the first year, mean Eskimo heights approached the lower fifth percentile of the Falkner curves.

With regard to feeding practices during the first month of life, 53 percent of these infants were breast fed only; by the 12th month of life, this percentage had decreased to 20. Solid food additives of cereal and fish were generally introduced by the sixth month. Canned baby foods or fruits of any kind did not provide a major source of solid food for the cohort as a whole. Until the fifth month of life, milk was essentially the only nutriment provided.

Maynard emphasizes the associations in his findings between respiratory disease frequency, hemoglobin levels and infant feeding practices. He also cites the work of Scott and Heller (1964) explaining the widespread prevalence of iron-deficiency anemia in Western Alaska Eskimos as due to a dietary preponderance of cereal and fish protein calories. Maynard states:

> Our results show that this deficiency is already well established in infancy, and provide an epidemiological groundwork of support for the assertion of Andelman and Sered (1966) that increases in infant hemoglobin levels through dietary iron supplementation can result in a decreased incidence of respiratory infection.

Heller's studies (*6*) in Alaska furnish the most definitive data currently available on dietary practices of American Indian and Alaska Native infants and preschool children. Although the diet of the urban Eskimos and Indians is essentially the same as that of the rest of the U.S. population, local meat and fish resources are still the most important sources of several nutrients for Eskimos and Indians living in their native villages, and their use is expected to continue. Imported foods, particularly milk, cereals, and breads, are important sources of calories. The use of canned and fresh products is limited because of cost and lack of proper storage facilities. Poor sanitation and lack of sufficient knowledge of water- and food-borne illnesses complicate the nutrition picture, and "weanling diarrhea" continues to be a major health problem in the north.

Seasonal Factors

Nutrient deficiencies and diarrheal diseases show seasonal peaks. Nutrient deficiencies in the diets of infants and preschool children, as well as in family diets, were more common from about midwinter to late spring. This is a period when the supplies of both imported and stored local foods are generally low, and fresh supplies are not yet available. Heller (*6*) cites work of Fortuine (1965–66), who found the incidence of acute diarrhea affecting infants was especially high during the traditional "camping months" of June through September in the Kuskokwim-Yukon Delta area of Alaska.

Nutrient Intakes

Heller (*2*) analyzed 282 diet records for formula-fed infants, ages 24 months and under, from a total of 555 diet records in 11 Alaska villages. Considerable discrepancy existed between the low and high average daily intakes for all 11 nutrients throughout this age period, regardless of season. Average daily intakes of calories, iron, thiamin, niacin and ascorbic acid were usually below the National Research Council's Recommended Dietary Allowances.

A significant number of average daily calcium intakes below the Recommended Allowances were found at the 6- to 11-month age level, increasing to over 50 percent at the 18- to 23-month age level.

Average daily intakes of protein and vitamin A were seldom below the Recommended Dietary Allowances until infants were 12 months of age and older. It appears that significant numbers of these infants, ages 12 to 23 months, do not receive adequate amounts of milk, nor do they have adequate supplementation of their diets with meat, fish or eggs.

About 75 percent of the dietaries at all age levels failed to meet the RDA for ascorbic acid. About 30 percent appeared devoid of ascorbic acid, and about 25 percent showed average daily intakes of 1 to 5 mg. Most of the foods that might possibly provide at least minimal intakes, such as local meats, fish, berries and greens, were infrequently given to infants under 9 to 10 months of age. With the older infants, these foods appeared on dietaries only sporadically or seasonally.

Of the total ascorbic acid intake, vitamin supplements furnished about 40 percent; fruits, mostly native berries, about 50 percent; dairy and vegetable products, about 5 percent each.

Ascorbic acid intakes varied much more throughout the seasons than did those of any of the other nutrients. During both the summer and fall seasons, use of mixed food preparations containing cloudberries (178 mg. or more ascorbic acid per 100 grams), wild edible greens, or fish livers increased. Because of the plentifulness of these foods in some areas, the mean intake of ascorbic acid in summer and fall approached the National Research Council's Recommended Dietary Allowances. The few families who went to traditional spring camps seemed to fare the best, for these campsites are usually located where fresh fish, wild fowl, wild fowl eggs, and sometimes wild edible greens are obtainable.

Vitamin preparations were used very infrequently, but when reported, they appeared most frequently in fall and early winter dietaries, but seldom in summer.

Imported foods, mostly milk and grain products, furnished the major portion of nine of the 11 nutrients for which the diets were analyzed. Local foods contributed 20 percent of the protein, iron, niacin and ascorbic acid.

Solid Food Supplements

Low nutrient intakes were due, primarily, to failure to add suitable solid food supplements to the infant's milk diet. This was due, in part, to lack of knowledge of the importance of such foods and the inability to obtain them (*6*).

The addition of solid foods to the diet of the Alaska Native infant is not commonly practiced until 8 to 12 months of age. Only 30 percent of the diet records for infants under 8 months of age showed a supplementary feeding of any kind. At 8 to 12 months of age, 60 percent of the records showed some solid food being used, but even at 13–18 months, about 10 percent of records showed that the child was still receiving milk only.

Previous data cited (*3*) from home visits by nurses who visited three times in the home of each infant are shown in Tables I–III.

The sections of the questionnaire regarding milk feeding habits were similar in the two studies. The sections regarding food additives differed. In the 1960–62 study, 10 foods (canned baby food, bread, cake, cookies, soup with no meat, soup with meat or fish, cereal, meat, fish, seal oil) and a category for "other" were listed; in the 1968–70 study, three foods (meat, fish and baby food) and "other" were listed. The data for both the 1960–62 and 1968–70 studies indicate that there is an increasing number of infants receiving foods other than milk, cereal, and soup in both the villages and Bethel. A few observations and impressions of the Alaska Indian Health Service public health nutritionists are:

1. Premastication by the mother of foods such as meat is still a practice among some Eskimos.
2. Evaporated milk is sometimes diluted more than with equal parts of water when used for toddlers. For example, bedtime bottles that are largely water are sometimes used. Sometimes whole canned milk (65 to 80 cents a quart) is diluted. Nonfat dried milk for family use is increasing, but often it is unpopular and has the reputation for causing illness (which may be due to the water used).

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3. Use of "jarred" baby and junior foods is increasing. Unfortunately, "dinners" and other mixtures seem to be most popular.

4. Dry, precooked baby cereals are very popular.

5. "Tang" is increasing in use and is well liked.

6. Kool-Aid and soft drinks are widely used in quantity. Some mothers do not consider these to be "sweets," which they know are not recommended. One reason for confusion is that mothers are told to give "pop" during periods of diarrhea and fever.

7. Wild berries are very popular and widely used in season, often to make "ice cream." Wild greens are much less frequently used but they are important in some remote Eskimo villages.

8. Rose hips seem to be important among some Athapascan Indians.

9. Unenriched rice and pancake mixes are used in large quantities. Recently a popular brand of pancake mix showed enriched flour in one package size.

10. Homemade yeast bread, fried breads, and pilot crackers are important staples. The most frequently used brand of pilot crackers is enriched, but other brands that are increasing in popularity are not enriched.

NUTRITION SURVEY OF WHITE MOUNTAIN APACHE PRESCHOOL CHILDREN

During 3 weeks of April 1969, George M. Owen et al. (*7*) conducted a nutrition survey of children between 1 and 6 years of age who are members of the White Mountain Apache Tribe in Arizona. Five Indian Health Service public health nutritionists obtained two 24-hour diet records on each of 201 children by visiting their homes accompanied by a bilingual Apache woman. Diet records were coded by Owen's staff and nutrient intakes analyzed by computer (Tables IV, V, VI and VII).

Of children visited in the home, 80 percent (164) were also examined in the clinic. Age distribution was 22 children, ages 12–23 months; 68 children, ages 24–47 months. The children lived on the reservation in the general areas of Cibecue, Whiteriver and East Fork.

Owen et al. in comparing these intakes with those of preschool children in Mississippi (*8*) stated:

> . . . those items in limited supply for some Apache children, i.e., calories, calcium, ascorbic acid, iron, vitamin A and riboflavin, were, with the exception of the latter two, those also in limited supply for some Mississippi children . . . It appeared that the proportion of Apache children with low levels of hemoglobin in blood or of iron, vitamin A, vitamin C in plasma and of riboflavin in urine (Table VIII) was similar to that of low-income children in Mississippi, and was two or three times the proportion of children in the National study with low values. . . . Protein intake was quantitatively acceptable but was often of poor quality and in many instances may have been utilized to some extent to meet energy needs. Average growth in height was significantly retarded (38 percent below the 10th percentile of the reference chart), although skeletal maturation was not delayed. The majority of Apache children were ingesting insufficient iron to meet current needs and to create iron stores (*7*).

Data shown in Table V raise some questions regarding standards used by Owen for evaluating dietary intakes of preschool children. Figures given for "low" intakes are considerably lower than Recommended Dietary Allowances. Calculations using data in Table IV on percentage distributions of nutrients for two age groups, 12 to 23 months and 24 to 47 months, reveal the following percentages of children failing to meet the National Research Council's Recommended Dietary Allowances:

Approximate percentages of children with intakes below the NRC recommended dietary allowances (1968 rev.)

Ages in months	Calories	Protein	Iron	Calcium	Vit. A	Ascorbic acid	Thiamin	Riboflavin
12 to 23.....	69	23	100	69	41	65	84	23
24 to 47.....	60	9	88	90	72	56	76	62

Percentage distributions of biochemical values in blood or serum appear in Table VIII.

Foods as sources of nutrients for the White Mountain Apache children are shown in data of Owen et al. (Tables VI and VII (*7*)).

Dairy Foods

Dairy foods made the greatest percentage contribution to the daily intake of nutrients of children 1 to 2 years of age. The decline in consumption of these foods is shown in the drop in supply of calcium from dairy foods: 80 percent in 12- to 23-months-olds to 51 percent in 24- to 47-month-old children. The corresponding decline in mean calcium intakes (Table IV) is from 609 mg. to 399 mg

Meat and Poultry

Meat and poultry supplied rather small percentages of the total protein (17 percent), iron (15 percent), thiamin (10 percent), and niacin (25 percent) for 1- to 2-year-olds. The percentage increases for 24- to 47-month-old children indicate a transition to family foods.

Legumes

Beyond the age of 2 years, legumes supplied approximately 13 percent of the protein, 22 percent of the iron and 13 percent of the thiamin.

Grains

Grains made appreciable contributions to the diet at both age levels—supplying 18–23 percent of the protein; 23–31 percent of the calories; 30–40 percent of the carbohydrate; 32–39 percent of the thiamin; 12–19 percent of the riboflavin; and approximately 30 percent of the niacin and iron.

Fruit

Citrus fruits and juices and other fruits supplied the major amounts of ascorbic acid, with potatoes supplying the remainder.

Vegetables

Leafy green and yellow vegetables, since they did not appear in the diets frequently, provided only small amounts of vitamin A (carotene). With the decline in milk consumption after infancy and low intake of butter and margarine, the dietary intakes of carotene and vitamin A could be expected to decrease. This tendency also appears in the data on percentage distribution of daily intakes (Table IV) for age 2 years and over.

Fats and Oils

These foods are not habitually eaten as spreads on breads. Usage is principally in food preparation. Only 2 percent or less of the calories could be attributed to animal and vegetable fats, oils and salad dressings.

Sweets

Sugars, syrups, jellies, and candies provided 9–12 percent of the carbohydrate. An additional 9–15 percent was furnished by soft drinks.

Beverages

The use of tea and soft drinks, which began in infancy, steadily increased throughout the preschool years. Expressed as a "percentage of total grams of food intake," milk decreased from 32 percent at 1–2 years to 11 percent at 2–4 years; tea and soft drinks increased from 24 percent at 1–2 years to 35 percent at ages 2–4 years.

FOOD AVAILABILITY

A review of infant and child feeding practices is incomplete without further mention of socioeconomic data and the food resources of Indian families. Some factors are limited cash income, decline in availability and use of indigenous foods, and the relatively higher food costs in Indian and Alaska Native reservations and villages. This is compounded by inflation and lack of suitable supplemental foods for infants and preschool children. There is need for more nutrition education and consultation than is possible to provide, due to lack of nutritionists.

The U.S. Department of Agriculture Supplemental Food Program for Low-Income Groups Vulnerable to Malnutrition is not available on most reservations. The Emergency Food and Medical Services program of the Office of Economic Opportunity is operated by Community Action programs under tribal auspices on some reservations.

The Food Stamp program, where available, has not been well accepted by Indian people due chiefly to certain of the administrative requirements. There may be improvements in participation following modifications in the program. The data in Table IX for Bethel, Nome and Kotzebue indicate that bonus coupons made a significant contribution, which was greater in the Bethel district, due perhaps to the larger number of households participating and to lower incomes. Hopefully, some of these funds are being utilized to improve feeding practices of infants and preschool children.

SUMMARY

The most striking evidence from the data reviewed is the inadequacy of total nutrients supplied by family foods throughout most seasons of the year. Transitions in Indian society have made the family dependent on a cash economy and food supplies from commercial sources or Federal food assistance programs where available. These changes are noted in the marked decline in breast feeding; the increasing use of sweets, soft drinks, tea, and Kool-Aid for infants and preschool children; the increases in usage of imported foods in

Alaska; and the decline in availability and use of native foods.

Certain of the formulas substituted for breast milk are inadequate in nutrients, improperly diluted and unsafely prepared in the home.

Solid table foods are often added late in the first year in the form of broth from stew, mashed table vegetables, mashed potatoes and gravy, mashed beans, ades or juices, and cooked cereals. If local supplies of meats, fish or wild berries are available in season, the child may be given these foods at 9 to 10 months of age.

Lack of knowledge of the importance of supplementary foods and inability to obtain them are primary reasons for these feeding practices. The use of canned baby and junior foods is increasing. "Dinners" and mixed foods seem to be more popular than the more nutritionally adequate meats or vegetables.

Significant numbers of children ages 1–4 years in Alaska, Montana, and Arizona studies had inadequate intakes of milk and other high quality protein foods. White Mountain Apache preschool children received 18–23 percent of their protein from grains and 13 percent from legumes. Certain nonenriched products—rice, pancake mixes, and pilot crackers—are sold in Alaska, Arizona and Montana. The latter two States do not require enrichment of flour. Montana recently enacted an enrichment law to be effective July 1971.

Foods which are good sources of vitamin A and ascorbic acid were very limited in the diets of preschool children and their families during most seasons of the year.

Nutrition studies have demonstrated the causative factors of lack of education and food availability within a context of rapid changes in Indian family living and environment. Although there is no simplistic answer to improving food habits, it is apparent that too little has been invested within Indian communities to solve the problems identified. Recent developments involving tribal governments and training of indigenous Indian allied health workers provide an additional resource.

Hopefully, the information obtained by the nutrition researchers and public health nutritionists will be useful in giving direction to efforts of the Indian people and Indian Health Service personnel.

Table I.—Percentages of infants fed by breast or formula in 3 Alaska communities [1]

	1960–62 village infants	1968–70 village infants	1968–70 Bethel infants
Breast feeding in 1st month	53	33	3
Breast feeding in 6 to 9 months	25	12	4
Formula feeding in 6 to 9 months	40	70	82

[1] Data of Bender (3).

Table II.—Percentages of infants of various ages in 3 Alaska communities not receiving foods other than milk or formula [1]

	1960–62 village infants	1968–70 village infants	1968–70 Bethel infants
1 month	89	81	23
2 to 3 months	51	29	18
4 to 5 months	18	11	6
6 to 9 months	5	2	3
10 to 11 months	0	1	0

[1] Data of Bender (3).

Table III.—Foods other than milk or formula commonly included in diets of Alaska infants in three communities [1]

Ranking of food additions	Age (months)				
	0–1	2–3	4–5	6–9	10–11
1960–62					
Village infants					
First	Cereal	Cereal	Cereal	Cereal	Bread
Second	Other	Soup, no meat	Soup, no meat	Bread	Soup with meat or fish
Third	Baby food	Other	Soup with meat or fish	Soup with meat or fish	Cereal
1968–70					
Village infants					
First	Cereal	Cereal	Cereal	Fish	Meat
Second	Fish	Baby food	Baby food	Meat	Fish
Third	Baby food	Fruit	Meat	Cereal	Table food
1968–70					
Bethel infants					
First	Cereal	Cereal	Vegetables	Meat	Meat
Second	Fruit	Baby food	Baby food	Baby food	Fish
Third	Meat	Fruit.	Meat	Fruit	Vegetables

[1] Data of Bender (3).

Table IV.—Percentage distribution of intakes of calories and nutrients by Apache children [1] in two age groups

Calories (kcal./kg.)	Less than 40	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 and above	Number	Mean
12 to 23 mos.	0	14	0	23	14	18	9	4	14	4	22	85
24 to 47 mos.	3	12	12	15	22	12	12	4	4	4	68	76

Protein (gm./kg.)	Less than 1.0	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 to 2.9	3.0 to 3.4	3.5 to 3.9	4.0 to 4.4	4.5 to 4.9	5.0 and above	Number	Mean
12 to 23 mos.	9	5	9	18	18	9	23	0	5	5	22	2.8
24 to 47 mos.	1	8	13	22	28	12	10	2	4	0	68	2.6

Calcium (mg.)	Less than 100	100 to 199	200 to 299	300 to 399	40 to 499	500 to 599	600 to 699	700 to 799	800 to 899	900 and above	Number	Mean
12 to 23 mos.	4	9	13	4	4	13	22	9	4	17	23	609
24 to 47 mos.	6	22	13	15	19	6	7	4	1	7	72	399

Vitamin A (I.U./kg.)	Less than 50	50 to 99	100 to 149	150 to 199	200 to 249	250 to 299	300 to 349	350 to 399	400 to 449	450 and above	Number	Mean
12 to 23 mos.	9	9	23	18	9	9	5	5	0	14	22	182
24 to 47 mos.	31	29	11	10	12	3	0	0	0	4	68	126

Ascorbic acid (mg.)	Less than 15	15 to 29	30 to 44	45 to 59	60 to 74	75 to 89	90 to 104	105 to 119	120 to 134	135 and above	Number	Mean
12 to 23 mos.	43	22	9	4	9	9	0	0	0	4	23	33
24 to 47 mos.	39	21	18	7	8	2	4	0	0	1	72	31

Iron (mg.)	Less than 2	2 to 3	4 to 5	6 to 7	8 to 9	10 to 11	12 to 13	14 to 15	16 to 18	19 and above	Number	Mean
12 to 23 mos.	4	35	38	12	12	0	0	0	0	0	26	4.73
24 to 47 mos.	5	10	35	29	14	4	2	1	0	0	94	6.30

Thiamin (mg./1000 kcal.)	Less than 0.10	0.10 to 0.19	0.20 to 0.29	0.30 to 0.39	0.40 to 0.49	0.50 to 0.59	0.60 to 0.69	0.70 to 0.79	0.80 to 0.89	0.90 to 0.99	1.00 and above	Number	Mean
12 to 23 mos.	0	8	15	35	8	19	0	0	12	0	4	26	0.44
24 to 47 mos.	2	5	11	17	20	9	15	5	7	5	3	94	0.52

Riboflavin (mg./1000 kcal.)	Less than 0.20	0.20 to 0.49	0.50 to 0.79	0.80 to 1.09	1.10 to 1.39	1.40 to 1.69	1.70 to 1.99	2.00 to 2.29	2.30 to 2.59	2.60 and above	Number	Mean
12 to 23 mos.	4	19	8	27	23	4	12	4	0	0	26	1.01
24 to 47 mos.	1	28	34	19	10	4	2	1	1	0	94	0.76

[1] Data of Owen et al. (7).

Table V.—Mean daily intakes of Apache children 12–47 months old [1]

	Calories	Protein	Calcium	Vit. A	Ascorbic acid	Thiamin	Riboflavin	Iron
	(kcal./kg.)	(gm./kg.)	(mg.)	(I.U./kg.)	(mg.)	(mg./1,000 kcal.)		(mg.)
Mean	78	2.6	450	140	32	0.5	0.8	6
Percent low	31	4	30	15	40	19	12	80
Low intakes	[2] <75	<1.2	<250	<35	<15	<0.3	<0.4	<3
	<60							

[1] Data of Owen et al. (7).
[2] <75 for children 12-23 months; <60 for children 24 months and older.

Table VI.—Percent contribution of 10 food groups to daily caloric and total nutrient intakes of 12- to 23-month-old Apache children [1]

	Percent contribution to daily intake									
	Dairy foods	Meat, poultry	Eggs	Legumes	Grains	Fruit	Vege-tables	Fat, oils	Sweets	Beverages
Total grams	33	4	3	3	12	14	5	1	2	24
Nutrient:										
Calories	32	7	6	5	23	10	5	2	4	5
Protein	42	17	11	6	18	1	4	<1	1	
Fat	45	11	12	5	16	1	5	5	<1	
Carbohydrate	19	1	<1	5	30	20	6	<1	9	9
Calcium	80	1	3	2	9	3	2		<1	
Iron	7	15	14	13	31	10	9	1	2	
Vitamin A	32	3	17	<1	9	12	27	<1		
Thiamin	29	10	6	6	32	9	7	1	<1	
Riboflavin	67	6	8	2	12	2	2	<1	<1	1
Niacin	25	25	1	4	30	3	11	1	<1	
Ascorbic acid	17	1	<1	<1	6	60	16			

[1] Data of Owen et al. (7).

Table VII.—Percent contribution of 10 food groups to daily caloric and total nutrient intakes of 24- to 47-month-old Apache children [1]

	Percent contribution to daily intake									
	Dairy foods	Meat, poultry	Eggs	Legumes	Grains	Fruit	Vege-tables	Fat, oils	Sweets	Beverages
Total grams	12	6	2	6	16	7	7	1	2	42
Nutrient:										
Calories	11	14	5	9	31	4	9	2	7	8
Protein	16	31	10	13	23	1	5	<1	1	
Fat	17	28	11	7	20	<1	10	5	2	
Carbohydrate	6	1	<1	9	40	7	9	<1	12	15
Calcium	51	2	5	7	25	5	3	<1	1	<1
Iron	1	22	9	22	31	4	8	<1	2	<1
Vitamin A	14	19	22	2	9	13	20	1	<1	
Thiamin	10	15	5	13	39	7	11	<1	1	
Riboflavin	36	18	11	5	19	2	5	<1	1	3
Niacin	4	38	1	8	27	3	17	<1	1	1
Ascorbic acid	5	1	<1	1	1	62	30			

[1] Data of Owen et al. (7).

Table VIII.—Percentage distribution of biochemical values in blood or plasma of Apache children [1]

Hemoglobin (gm./100 ml.)	Less than 10	10.0 to 10.4	10.5 to 10.9	11.0 to 11.4	11.5 to 11.9	12.0 to 12.4	12.5 to 12.9	13.0 to 13.4	13.5 to 13.9	14.0 and above	Number	Mean
12 to 23 mos.	24	19	10	10	5	10	14	9	0	0	21	10.8
24 to 47 mos.	3	3	7	2	2	20	17	19	14	13	59	12.8

Plasma iron (μg./100 ml.)	Less than 20	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 and above	Number	Mean
12 to 23 mos.	23	41	5	9	5	5	0	0	0	15	22	37
24 to 47 mos.	7	7	10	9	20	7	10	12	6	12	69	63

Vitamin A (μg./100 ml.)	Less than 10	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 and above	Number	Mean
12 to 23 mos.	0	10	50	20	10	10	0	0	0	0	10	33
24 to 47 mos.	2	19	44	10	15	6	2	0	0	2	48	31

Ascorbic acid (mg./100 ml.)	Less than 0.1	0.1 to 0.2	0.3 to 0.4	0.5 to 0.6	0.7 to 0.8	0.9 to 1.0	1.1 to 1.2	1.3 to 1.4	1.5 to 1.6	1.7 and above	Number	Mean
12 to 23 mos.	9	30	4	13	17	4	13	9	0	0	23	0.6
24 to 47 mos.	0	16	8	20	21	15	11	6	0	3	66	0.7

Albumin (gm./100 ml.)	Less than 2.5	2.5 to 2.9	3.0 to 3.4	3.5 to 3.9	4.0 to 4.4	4.5 to 4.9	5.0 and above				Number	Mean
12 to 23 mos.	0	0	0	71	29	0	0				21	3.9
24 to 47 mos.	2	0	3	30	57	8	0				63	4.0

Thiamin (μg./gm. Cr.)	1 thru 249	250 to 499	500 to 749	750 to 999	1,000 to 1,249	1,250 to 1,499	1,500 to 1,749	1,750 to 1,999	2,000 to 2,499	2,500 and above	Number	Mean
12 to 23 mos.	0	0	0	0	33	0	0	0	33	33	3	4,550
24 to 47 mos.	0	2	12	5	8	4	12	4	10	43	49	2,757

Riboflavin (μg./gm. Cr.)	1 thru 249	250 to 499	500 to 749	750 to 999	1,000 to 1,499	1,500 to 1,999	2,000 to 2,499	2,500 to 2,999	3,000 to 3,499	3,500 and above	Number	Mean
12 to 23 mos.	0	0	0	0	33	0	0	0	0	67	3	5,750
24 to 47 mos.	2	5	17	9	21	6	6	11	0	23	47	2,118

Iodine (μg./gm. Cr.)	1 thru 49	50 to 99	100 to 199	200 to 299	300 to 399	400 to 499	500 to 599	600 to 699	700 to 799	800 and above	Number	Mean
12 to 23 mos.	0	0	0	0	0	0	0	0	0	100	3	3,925
24 to 47 mos.	0	0	2	4	4	13	13	9	8	47	45	1,558

[1] Data of Owen et al. (7).

Table IX.—Participation in the food stamp program in various Alaska communities, April 1970 through October 1970

Month	Number of households participating	Number of individuals	Total dollar value of coupons issued	Amount paid by participants	Value of bonus coupons
Bethel Welfare District:					
April	1,024	5,685	158,704	15,871	142,833
May	955	5,449	152,951	15,866	137,085
June	1,005	5,811	159,910	15,478	144,432
July	911	5,312	142,015	17,948	124,067
August	869	5,143	144,260	16,391	127,869
September	864	4,290	146,791	16,725	130,066
October	958	5,735	163,903	18,356	145,547
Nome Welfare District:					
April	363	1,819	53,137	13,757	39,380
May	359	1,885	54,286	14,671	39,615
June	348	1,827	49,117	13,247	35,870
July	302	1,680	47,715	12,050	35,665
August	296	1,649	45,194	12,850	32,344
September	281	1,522	39,860	10,778	29,082
October	289	1,530	44,178	11,214	32,964
Kotzebue Welfare District:					
April	268	1,366	41,120	8,699	32,421
May	276	1,413	39,218	9,021	30,197
June	271	1,394	39,556	7,678	31,878
July	253	1,371	39,874	9,832	30,042
August	248	1,218	34,630	9,440	25,190
September	221	1,098	32,800	7,282	25,518
October	269	1,309	38,786	8,015	30,771

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2. C. A. Heller and E. M. Scott, *The Alaska Dietary Survey 1956–61*, Environmental Health Series, Arctic Health, P.H.S. Publication No. 999–AH–2 (Washington: U.S. Government Printing Office).
3. T. R. Bender, "Alaska Activities, 1960–70," Ecological Investigations program, Center for Disease Control (unpublished).
4. *Blackfeet and Fort Belknap Indian Reservation Nutrition Surveys*, reports by the Interdepartmental Committee on Nutrition for National Defense and the Indian Health Service, USPHS–DHEW, December 1964.
5. J. E. Maynard, "A Study of Growth, Morbidity and Mortality Among Eskimo Infants of Western Alaska," *Bull. World Health Org.* 42 (1970) : 613.
6. E. M. Scott and C. A. Heller, "Nutrition in the Arctic, Physiologic Adjustments to Cold and Altitude," *Arch. Environ. Health* 17 (1968) : 603.
7. G. M. Owen et al., "Nutrition Survey of White Mountain Apache Preschool Children." in *Nutrition, Growth, and Development of North American Indian Children*, edited by W. M. Moore, M. Silverberg, and M. S. Read, USPHS–DHEW (Washington: U.S. Government Printing Office, 1972).
8. G. M. Owen et al., "Nutritional Status of Mississippi Preschool Children," a pilot study, *Amer. J. Clin. Nutr.* 22 (1969) : 1444.

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Rebecca M. Roseberry, Albuquerque and Navajo Area Offices.
Veta Mae Wenzel, Portland Area Office.

Discussion

Miss Helen Ger Olson, Session Chairman: As we have discussed, the Indian population of the United States includes more than 250 different tribes and Alaska native village groups. These individuals live primarily in 24 States and economically, educationally, and in health compare unfavorably with the general population. The majority of Indians live on land of marginal productivity, and few employment opportunities are available. Indian families average about six persons. Two-thirds of the population subsists on less than $3,000 per family per year and about one-half of family incomes are less than $2,000 per year. The infant mortality rate is 1½ times and the postneonatal mortality rate three times that of the general population. A high incidence of infectious diseases accounts for the majority of the neonatal deaths.

Miss Peterson: The cyclic nature of infectious diseases and malnutrition is evident in Alaskan dietary studies. Acute diarrheal diseases, which are especially high during the camping months of June to September, are superimposed on nutrient deficiencies common from midwinter to late spring when supplies of stored foods are low.

Mrs. Kathryn M. Kram: Among the White Mountain Indian tribe in Arizona, we noted extensive use of unenriched flour, although enriched flour was available free as part of the commodity distribution program. We also noted widespread consumption of soft drinks, which may be due in part to the unsatisfactory water supply.

Mrs. Margarita Kay: The Papago Indians are not as numerous as the Apaches or Navajos but do represent a considerable number of people. Their diet consists primarily of popovers (fried bread) made from white flour and fried in lard. These are usually served with beans. Papago Indian babies weigh approximately 9 pounds at birth and, as a rule, grow into fat children. By the time they reach adulthood, blood sugar levels of many are reported* to be incredibly high. I don't believe a thorough study of their diet has yet been carried out.

Miss Olson: Arizona does not have laws for enrichment of flour and bread. Unenriched bread and flour are sold in trading posts on a number of the Arizona Indian reservations.

A very high incidence of diabetes mellitus has been reported in adult Indians of some tribes but onset is usually not until after 35 years of age. Frequently it is possible to control the diabetes with only moderate dietary restriction and, if indicated, weight loss, but without insulin or hypoglycemic agents.

Dr. Ogden Johnson: Garn has noted retarded bone growth in Indian children, probably reflecting suboptimal nutritional status. In the lower Greasewood area, milk seemed to be replaced by milk plus coffee at an early age.[1] Is this a typical pattern?

Miss Olson: I think it occurs not only among the Navajos but among Indians on the majority of reservations. It is probably explained, at least in part, by the lack of refrigeration and high price of milk.

Dr. Johnson: In the Lower Greasewood area, infants were fed table foods very early. Commercially prepared strained foods were not widely used.

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*The editors are not aware of published reports concerning the prevalence of diabetes mellitus in Papago Indians. However, a recent report indicates a high prevalence among Pima Indians and refers to other reports of high prevalence in Seneca, Cherokee, and Cocopah Indians (P. H. Bennett, T. A. Burch, and M. Miller: Diabetes Mellitus in American (Pima) Indians. *The Lancet*, July 17, 1971, pp. 125–128).

[1] Department of Community Medicine, University of Pittsburgh, The National Nutrition Survey and the US PHS, Indian Health Service: Nutrition Survey of the Lower Greasewood Chapter, Navajo Tribe, 1968–69. (Publisher and publication date not cited in booklet.)

Dr. Ruth M. Leverton: At the request of the medical staff of the Indian Health Service, the USDA is launching a pilot study of the feasibility of furnishing an iron-enriched, powdered infant formula to the Navajo Reservation as part of the commodity distribution program. The logistics of transportation are a strong factor in favor of powdered formula rather than evaporated milk or concentrated liquid formula. The Navajos know about boiling water because that is how they make their coffee. Mothers might therefore be taught how to make the powder into a safe formula. It has been suggested that these infants should be fed ready-to-feed formula provided in disposable units, thus eliminating a major source of infection. However, cost is extremely high and problems of transportation would be formidable.

Miss Olson: Many families have only one bottle with no spare—surely a contributing factor to the high incidence of infectious disease among Indian infants. The water is often unsafe for human consumption, and a substantial proportion of the homes of Indians and Alaska natives are without a water supply, other utilities or any safe means of waste disposal.

Dr. Lloyd J. Filer, Jr.: It is impossible to grow bacteria in a dry powder. These powders have about 2 percent moisture content. If a can of powdered formula is inoculated with staphylococcal organisms, they will not grow. I am not worried about contaminating the contents of the can; the problem arises after the powder is taken from the can and mixed with water.

Dr. Samuel J. Fomon: Some years ago we did a small study on bacterial content of formulas prepared by mothers.[2] These were well-educated mothers who were breast feeding their babies and making up 1 bottle a day to feed to the infant as a supplementary feeding. We requested that they make up 2 bottles—one for the baby and one for us. Probably they imagined that we were going to test this for chemical composition to see how close they came to what we thought the baby was getting. We did not discuss why we wanted the bottle. A number of mothers were using a powdered formula, and we reviewed with them how they made it up. A few were using what we call "finger leveling" (a scoop of powder was leveled with the finger); the number of organisms per milliliter by the time of our analysis was in the millions. The coliform count was not higher with finger leveling than with use of unsterile bottles without finger leveling. In either instance it was very high.

Miss Mary Lynch: Many people in Roxbury use only 1 bottle, especially the poorer people who do not have enough money for a second bottle.

Mrs. Elsa Alvarez: Many people we visit in Philadelphia also use only one bottle.

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[2] Fomon, S. J., Thomas, L. N., Cerny, J., and Morris, R. L.: Bacterial counts of formulas prepared by mothers. Letter to the Editor, *J. Pediat.*, 55:122, 1959.

General discussion

Dr. Lloyd J. Filer, Jr., Session Chairman: Thus far in our meeting, a number of persons have mentioned customs relating to breast feeding, formula feeding, feeding of commercially prepared strained and "junior" foods, and of table foods. I think it would now be appropriate to engage in more general discussion of each of these topics.

BREAST FEEDING

Dr. Samuel J. Fomon: Prolonged breast feeding is rarely practiced in the United States. For the country as a whole, approximately 25 percent of infants are breast fed at the time of discharge from the hospital, but only 15 percent are breast fed for 3 months and only 10 percent for 4 months.[1] Among low-income groups it would appear that considerably fewer than 25 percent even begin breast feeding. That breast feeding is less frequently practiced among low-income than among higher income groups is remarkable because the low-income women are less frequently separated from their infants for extended periods.

I believe that most physicians do not encourage, and in fact discourage, breast feeding. Breast feeding is likely to be a nuisance to the physician. Mothers ask him hard questions that he is not well prepared to answer. Rather than be put in that position, he has the mother use a method of feeding that causes him less trouble. In addition, oral contraceptives are widely used and unquestionably these inhibit lactation.[2, 3]

Mrs. Margarita Kay: The intrauterine contraceptive device (IUD) also works against breast feeding, although the action is indirect. Physicians refuse to insert the IUD in the absence of menstrual bleeding. Since lactation inhibits ovulation, at least in the early months, women may avoid breast feeding or may discontinue this method of feeding earlier than would otherwise be the case in order to be eligible for insertion of an IUD.

Dr. Virginia H. Young: The trend will be difficult to reverse. Some low-income groups discontinue breast feeding because it is a part of the old pattern and not part of what they believe reflects higher status.

Dr. Myrtle Brown: Middle-income mothers who want to breast feed must often shop around for a sympathetic physician who will help them. Low-income mothers have much less opportunity to do this.

Miss Barbara Garland: Failure to breast feed among these women may result from simple inability to provide an ample supply of milk. We must ask whether a woman who is exhibiting symptoms of malnutrition can be expected to breast feed. In Kentucky we did not encourage women to breast feed because many were living on gravy and biscuits or fried potatoes and water. Nevertheless, in a recent survey of preschool children, we found that 27 percent had been breast fed—a higher percentage than among most American groups.

Miss Faustina Solis: Immigrants face additional problems in relation to breast feeding. Life in a new country requires adjustments that can be very harsh. Children need more care at a quicker pace, which does not allow for the casual nursing of babies. Many of the women have to work outside the home to augment family income and thus cannot continue to nurse their babies. This is particularly true of the mothers in the rural areas who engage in fieldwork.

Mexicans have long linked emotional stresses to physical disorders. Mothers who are under stress or constantly worried are reluctant to breast feed. They believe that their milk will sour and be harmful to the baby.

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[1] Fomon, S. J.: A pediatrician looks at early nutrition. *Bull. N.Y. Acad. Med.* 47: 569, 1971.

[2] Miller, G. H., and Hughes, L. R.: Effects of a new low dose oral contraceptive on lactation and genital involution in breast feeding mothers. Observations on the effect on their infants. *Obstet. Gynec.* 35: 44, 1970.

[3] Fomon, S. J., Filer, L. J., Jr., Thomas, L. N., and Rogers, R. R.: Growth and serum chemical values of normal breast-fed infants. *Acta Paed. Scand.* (Suppl. 202), 1970.

Miss Doris E. Lauber: I know of one large general hospital in a major western city to which women come from low-income areas to have their babies. Staffing in the hospital is insufficient to take the infants to the mothers for feeding. Breast feeding is therefore discouraged. Second, mothers may be given medication to "dry up" the milk. Finally, the mother is given a commercially prepared formula to take home and, believing that it must be best for the baby, she attempts to continue using it. In doing so, she may overdilute the formula, in order to reduce cost. Previous cultural patterns, such as those relating to breast feeding, are given up because the individuals have migrated away from their families and no longer have mothers and relatives to give them advice and moral support.

Miss Mary Lynch: In Roxbury there are a number of Central Americans and Puerto Ricans who, in their own cultures, would breast feed their infants at night and in the early morning. During the day they would work on the farms. They believe the heat of the sun is harmful to the breast milk and therefore would give a milk formula during the day. In the United States most of these same mothers bottle feed. They have been taught in the clinics and hospitals that bottle feeding is the thing to do.

MILK AND FORMULA FEEDING

Dr. Ruth M. Leverton: In relation to the use of evaporated milk in feeding infants of low-income groups, I would like to bring to the attention of the group a recent report by Rivera [4] concerning the frequency of use of various kinds of milk during infancy in middle- and lower-class families. Perhaps one of the pediatricians would discuss this report.

Dr. Fomon: As may be seen from figure 1, Rivera's data on types of milks and formulas fed to infants cared for by pediatricians in private practice in New York City and San Francisco are similar to data reported [5] for the entire United States (figs. 2 and 3). However, in clinic practice in New York City (fig. 4), there is much greater use of evaporated milk formulas and less use of commercially prepared formulas.

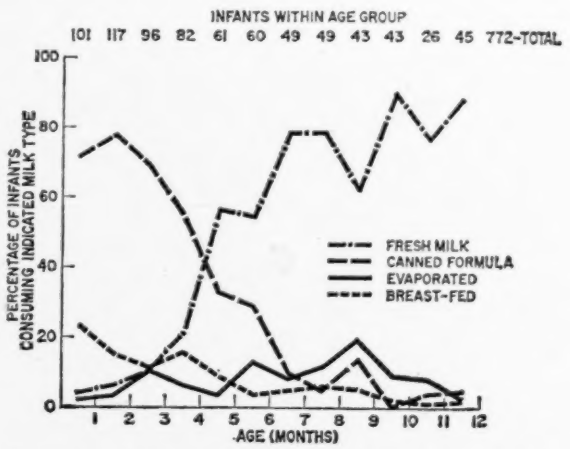

Figure 1.—Frequency of use of various kinds of milk among infants seen in private practice in New York City and San Francisco, spring 1969. Source: Rivera, J., "A.J.P.H." 61: 277, 1971.

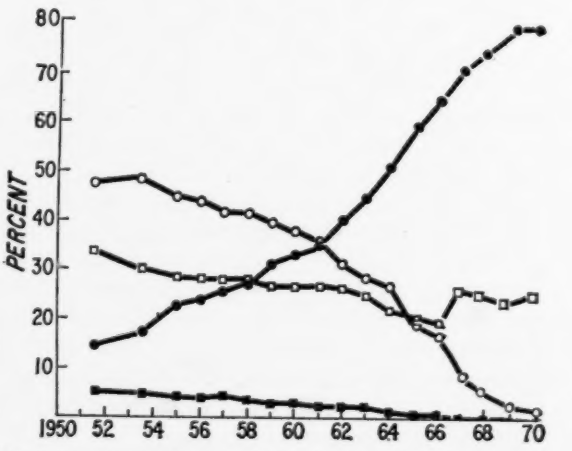

Figure 2.—Percentage of infants in the United States that received various types of feeding between 1951–70. Data pertain to the time of discharge from hospital after birth. Legend: o=evaporated milk formulas; □=breast feeding; •=commercially prepared formulas; ■=whole cow's milk. A small percentage of the breast-fed infants also received a formula. Source: Fomon, S. J., "Bull. N.Y. Acad. Med." 47: 569, 1971, using data of D. O. Cox.

[4] **Rivera, J.: The frequency of use of various kinds of milk during infancy in middle and lower income families.** *A.J.P.H.* 61: 277, 1971.

[5] Fomon, S. J.: A pediatrician looks at early nutrition. *Bull. N.Y. Acad. Med.* 47: 569, 1971.

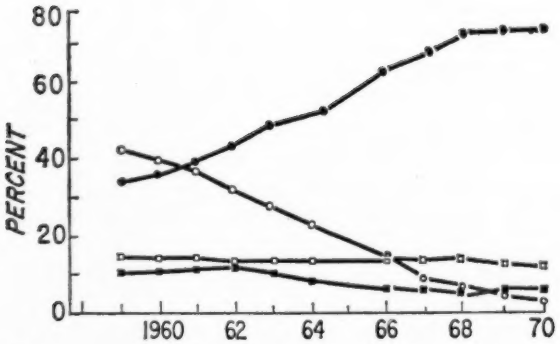

Figure 3.—Percentage of 2-month-old infants in United States receiving various types of feeding between 1959–70. Legend: Same as in fig. 2. Source: same as for fig. 2.

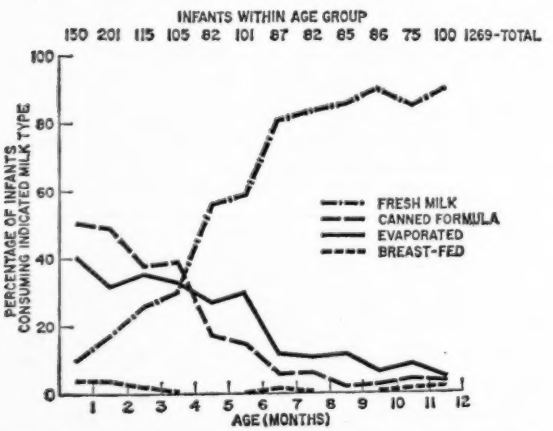

Figure 4.—Frequency of use of various kinds of milk among infants seen in well-baby clinics in New York City, spring 1969. Source: same as for fig. 1.

Miss Mary C. Egan: In a sample of 74 infants, 3 weeks to 2 months of age, studied in an M & I project in Houston in 1968, 43 percent were fed evaporated milk and 52 percent were fed commercially prepared formulas. Five percent were breast fed. Between 3 and 5 months of age 35 percent were receiving homogenized milk. Among the 6- to 8-month-old infants (107 infants), 16 percent were fed evaporated milk; 30 percent, commercially prepared formulas; and 53 percent, homogenized milk. These data are generally similar to reports we have received from various clinics in other sections of the country.

Miss Garland: In North Carolina, perhaps one of 10 women continue to feed commercially prepared formulas. Usually the infant is given evaporated milk for economic reasons. In Kentucky, where we were able to supply formula free of charge, the infants did continue to receive it.

Dr. Leverton: Wunderle and Call [6] have reviewed experiences with the Food Certificate program in Chicago. Use of commercially prepared formulas was practically the same whether mothers were getting additional food certificates to purchase the formula or were using their own cash resources. Apparently the families are convinced of the importance of feeding a commercially prepared formula and are going to see that their young infants have it, regardless of income.

Dr. Filer: The findings of Wunderle and Call [6] are summarized in Table G–1. Approximately two-thirds of the infants less than 6 months of age were receiving commercially prepared formulas. A somewhat higher percentage of these infants than of infants from higher income families were receiving evaporated milk.

I would like to comment on relative costs of feeding prepared formulas, evaporated milk and homogenized milk. As shown in Table G–2, the price differential is not great.

Dr. Thomas A. Anderson: We might also comment on costs of commercially prepared strained foods in relation to costs of formula or evaporated milk. Table G–3 indicates that cost per 100 kilocalories from strained foods is substantially

Table G–1.—Milks and formulas fed to infants of poverty groups in Chicago, Ill., and Macon, Ga., in 1970 [1]

	Age less than 6 months		Age 6–12 months	
	Chicago	Macon	Chicago	Macon
Number of infants	305	186	361	185
Type of milk or formula (percent of infants receiving):				
Commercially prepared formula fortified with iron	16	27	6	6
Commercially prepared formula not fortified with iron	49	42	17	8
Evaporated milk formula	15	17	9	15
Whole cow's milk	19	12	67	69
No milk or milk-free formula	2	1	1	2

Data from Tables 3.38 and 3.39 of Wunderle and Call (footnote 6).

[6] Wunderle, R. E., and Call, D. L.: An Evaluation of the Pilot Food Certificate program in Chicago, Ill., and Bibb County, Ga. Research Report submitted from the Graduate School of Nutrition, Cornell University, Ithaca, N.Y., to the Food and Nutrition Service, U.S.D.A., April 1971.

Table G-2.—Cost comparison: infant feeding

Item	Range in cost per 26 ounces	Cost of added iron and vitamins [1]	Total cost
Homogenized Milk	$0.20–$0.28	$0.07	$0.27–$0.35
Formula A	[2] 0.29– 0.33		0.29– 0.33
Formula B	[2] 0.29– 0.33		0.29– 0.33
Evaporated Milk	[2] 0.16– 0.20	0.07	0.23– 0.27

[1] Per 26 oz.—Vitamins A, C, B, in drops (0.6 ml.), $0.04; 15 mg. $FeSO_4$, $0.03.
[2] Cost of 13 fl. oz. can—will provide 26 oz. when diluted with an equal volume of water.

Table G-3.—Comparative costs of infant foods [1]

Item	Cents per ounce	Cents per 100 kcal.
Strained Foods:		
Plain Vegetables	2.3	20.4
Soups and Dinners	2.3	14.7
Fruits	2.3	9.6
Prepared Formula:		
Ready-to-Use	1.7	8.6
Concentrated liquid: Diluted 1:1	1.1	5.8
Evaporated Milk Formula [2]	0.6	3.1

[1] Supermarket prices, 1970, Iowa City, Iowa.
[2] Evaporated milk, 13 fl. oz.; 19 oz. water and 1 oz. of Karo sirup.

greater. It should be noted also that a considerably greater percentage of a can of prepared formula or evaporated milk than of a jar of baby food is likely to be consumed by the infant. Especially with young infants, a substantial proportion of a jar of strained food may end up on the infant's face, bib or clothing.

Dr. Ogden Johnson: Comparative costs of baby foods do not seem to me a very relevant consideration.

Dr. Norge W. Jerome: I agree. To view food use in these terms does not take into account the meanings of food to people.

Dr. Fomon: We are not suggesting that foods for infants be purchased on a cost-per-calorie basis. On the other hand, it is highly desirable for nutritionists and physicians to be aware of cost differences so that they will not encourage use of diets that are much more expensive than necessary. If a family considers early introduction of strained foods to be a symbol of love or an indication of ability to provide for their children, the significance of the food clearly overshadows consideration of cost.

FOODS OTHER THAN MILK OR FORMULA

Dr. Fomon: As is true of higher income groups, there appears to be a widespread practice among low-income groups of introducing strained foods by 1 or 2 months of age. A rather striking difference between higher income and lower income groups relates to the use of junior foods. Per capita consumption of junior foods is almost certainly much greater by infants of upper income groups. The lower income groups use strained foods in many cases, but do not seem to use junior foods. Table foods appear to be introduced much earlier than textbooks would lead us to believe. In low-income groups most infants are probably fed table foods by the sixth month of age.

Miss Catherine Cowell: In several of our Infant Day Care Centers in New York, we stocked up on junior foods but found that by 6 months the infants were totally on table foods so we did not have an opportunity to use the junior foods.

Miss Helen Starina: In Montana, mothers are reluctant to feed table foods, even mashed potatoes, at ages 6, 9 and 12 months. We see a widespread use of junior foods. I think it is largely a matter of convenience and because parents are convinced that baby foods are especially suitable for the baby.

Dr. Filer: In 1962 and 1963, Martinez and I surveyed 8,000 mothers by questionnaire and reported [7] our observations of what 6-month-old infants eat. Recently Martinez has repeated the studies in relation to food intake data of 3-, 6-, 9- and 12-month-old infants. His findings are reported in Table G–4. The percent of calories accounted for by solid foods at a specified age are probably somewhat greater in 1971 than they were in 1962 and 1963 and also somewhat greater for low-income groups than for those of higher income.

Miss Egan: Do you think there is more pot liquor used in rural farm areas than in urban

Table G–4.—Effect of age on contribution of solid foods to the infant diet [1]

Age (months)	Number of infants	Percent of calorie intake	
		Formula	Solid foods
3	3,197	69	31
6	4,607	62	38
9	2,923	42	58
12	1,576	36	64

[1] Unpublished data of Gilbert A. Martinez, Ross Laboratories, 1970.

[7] Filer, L. J., Jr., and Martinez, G. A.: Intake of selected nutrients by infants in the United States: An evaluation of 4,000 representative 6-month-olds. *Clin. Pediat.* 3: 633, 1964.

areas? What do we know about the nutrient values of pot liquor?

Miss Cowell: Frequently among certain families in our child health clinics in New York City, pot liquor with crumbled cornmeal-type dumplings (to give thicker consistency) is fed from bottles. We have also found that some Central American and South American mothers mash beans to the consistency of cornmeal and feed them from a bottle, either added to the milk or in place of milk.

We know very little about the nutrient content of pot liquor. We might be in for some surprises. As a graduate student I sampled many bushels of kale and collards cooked by various methods. We assume that vitamin C is easily destroyed by heat, but I found that after kale and collards had been cooked for several hours and stored in the refrigerator for a few days, some vitamin C remained. For some, the contribution of vitamin C would be appreciable because of the quantity of greens in their diets.

Miss Lynch: In Roxbury, we find that infants and toddlers are fed mashed potatoes with gravy but no meat. It is thought that meat encourages intestinal parasites. Fresh fish is fed to promote brain development. Some Spanish-speaking mothers will not give their children cereal because they cannot read the labels and therefore do not know how to prepare the food. They are accustomed to using a potato starch, cornstarch or arrowroot starch, mixed with milk and seasoned with nutmeg and sugar.

Dr. Charles A. Valentine: It seems that a few generalizations may be permissible on the basis of the various papers and comments. First, most of the groups of poor people described appear to succeed remarkably well in providing their infants and young children with diets which prevent at least major nutritional deficiencies. Next, ethnic differences, in the sense of contrasting cultural traditions, seem to produce only minor differences in the diet at this particular age level.

The "culture of poverty," with its emphasis on ignorance, disorganization and inability to cope, seems to loom rather large in the expectation of the "experts" but receives little support from the actual evidence reported. Those deficiencies and problems which do recur from one group to another are most clearly related to the stark material conditions of poverty.

Finally, we should remind ourselves that feeding infants and children is an aspect of social behavior that is rather deeply rooted in material, biologic and emotional needs. We are dealing with an elementary human capacity for survival little influenced by different cultural styles, standards and values.

DIETARY SOURCES OF IRON

Dr. Filer: The Valentines reported that only five of 20 infants in their study were receiving 10 mg. or more of iron per day. This observation agrees with my belief about the United States as a whole. Of the five infants, three were receiving most of their iron intake from iron-fortified infant cereals, one was receiving an iron-fortified formula and one was receiving Bosco.

Miss Cowell: Less than 1 percent of infants in our survey sample were being fed iron-fortified formulas.

Mrs. Mary Ellen Wilcox: Most of the families we see do not recognize the importance of feeding iron-fortified formulas. Our clinics provide iron and vitamin supplementation free but I am not at all sure the supplements are given regularly enough to fill the need.

Dr. Fomon: Infant cereals are much better sources of iron[8] than are strained and junior foods.[9] Unfortunately, they are not regularly fed to infants after 6 months of age. The problem of supplying iron to infants between 6 months and 18 months of age seems to be a particularly difficult one.

Dr. Filer: At a recent workshop on iron, Dr. Hartley Howard of the Borden Co. described a market test done in Georgia and in a Midwest community. Borden replaced their regular homogenized, vitamin D-fortified milk with a similar product to which 10 mg. of iron had been added per quart. In Georgia it was priced 1¢ above the previous market price, whereas in the Midwest the price for the new product was the same as for the old. Advertising was carried out by television or newspaper. Sales dropped in Georgia in the face of the 1¢ price differential, but when the price was reduced, sales returned to the previous level.

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[8] Anderson, T. A., and Fomon, S. J.: Commercially prepared infant cereals: Nutritional considerations. *J. Pediat.* 78: 788, 1971.

[9] Anderson, T. A., and Fomon, S. J.: Commercially prepared strained and junior foods: Nutritional considerations. *J. Amer. Diet. Assoc.* 58: 520, 1971.

In the Midwest, sales were not affected by the change in product. Of sales 75 percent were made to persons who did not realize they were buying an iron-enriched product. There were no adverse complaints about the new milk. By interviewing the purchasers, it was found that they knew dietary iron to be important for women, but many were not aware of the need for iron supplementation of the diets of infants and children. After 4 months of test marketing, Borden abandoned the program and went back to the original homogenized, vitamin D-fortified milk.

OPTIONS FOR PURCHASE OF FOOD

Dr. Filer: We are frequently told that low-income groups may pay more for food than do people with higher incomes. I wonder whether we might now turn our attention to this point.

Miss Solis: The vicious cycle of indebtedness that plagues the urban and rural poor usually centers on the food bill. Many families purchase food through credit, often paying more without having better choice of foods. During peak employment, outstanding bills are commonly paid, at least in part, but during seasonal unemployment the indebtedness again increases.

Mrs. Betty Lou Valentine: The most accessible outlets in Blackston are small corner groceries. Here the products available are generally restricted to half a dozen prepared food items: one or two kinds of fruit, one or two kinds of vegetables, and a mixed dinner or two; one type of baby cereal; plus evaporated and homogenized milk. Prices for these items in small stores are approximately 20 percent higher than in supermarket chains. The range of items and brands available is much wider in chain stores. Supermarket prices for prepared baby foods are about the same within Blackston and in neighboring higher income, predominantly white communities. On the other hand, the same chains often have less variety and generally charge an average of 25 percent more for most other common foods in their outlets in the black community. Afro-American parents therefore make most of their major food purchases in supermarkets, and they try to shop outside their community when possible.

Miss Garland: Options for purchase of food by the poor in Appalachia are also limited. The local grocer has usually provided credit to a family over the years. The family therefore feels obligated to trade with him even when selection and prices are more favorable in the supermarkets. Because of the problems involved in keeping perishables and because of food preferences of the families, the stores are likely to provide little variety and few fresh meats and vegetables. Thus, even when food stamps or cash are available, the family does not always have access to the food supply which would provide a nutritious diet. Similarly, the variety of strained baby foods available for purchase is usually limited to applesauce, a few vegetables, meat with vegetables, puddings and custards. Although rice cereal may be recommended for the infant, it is often not available.

The bond ultimately developed between the local store owner and the family cannot be broken by the possible advantages of shopping elsewhere. Furthermore, the stigma attached to the use of food stamps is considerably greater in a strange environment such as the supermarket than in the local grocery where one is known.

Mrs. Elsa Alvarez: Several small Spanish markets ("bodegas") are located in the Spring Garden Community in Philadelphia. They differ from the "botanicas" where herbs, saint images and prayers are sold. The residents usually buy on credit. The storeowner is bilingual and is able to help his customers with interpreting when the need arises in relation to a bill collector, the landlord, the police, or the door-to-door salesman. He is their counselor and friend and may be the godfather to some of their children. He provides them with merchandise without money, lends them cash if they need it. Usually the merchandise is more expensive than in the American grocery store, but the people feel content in paying the extra cost because of the close personal ties and other benefits. Most of the food is bought on a daily basis. Children are sent to the store without money several times a day to obtain whatever is needed. Records are kept by the storeowner but rarely by the head of the household.

Miss Solis: It has impressed me that the grocery store entrepreneur is more sensitive to the food habits of his families than are the service agencies. The grocer's profit is dependent upon his knowledge of his customers and his ability to supply their needs. It is interesting to observe the rapidity with which changes in food availability occur when grocers become familiar with new families in their locality. Health and social services often do not seem to have that flexibility.

Summary

Dr. Samuel J. Fomon: We began this workshop with the presentation of survey data and discussion of the validity of such data. Because surveys characteristically depend to a large extent on questionnaires administered by strangers, there is bound to be some uncertainty concerning whether the answers to the various questions reflect what people do or merely what they say they do. It was pointed out that most people are poor observers of their own behavior; furthermore, they are likely to shade their responses to correspond with what they believe to be the expectancies of the questioner.

Undoubtedly, problems in the use of a questionnaire approach are multiplied in dealing with low-income groups and cultural subgroups. For various reasons, there is a tendency to look with suspicion on strangers from the dominant culture, and answers to questions may be evasive or misleading. In addition, the translation of behavioral data into verbal terms is always difficult and becomes even more difficult when the vocabulary of the questioner is not one by which the respondent ordinarily thinks of his behavior.

In considering the enormous difficulties involved in accumulating valid data by the questionnaire approach, we discussed some of the differences between this method of data collection and participatory observation. I believe we were all inclined to agree that highly trained observers living in a community and accepted by its inhabitants will be able to obtain information that would not be obtainable by other methods. Numerous cross-checks on the data can be introduced, and it seems to me that participatory observation at its best will almost certainly yield data of greater validity than will the best survey relying on the questionnaire approach. This judgment does not mean that we believe participatory observation to be the most suitable approach for all purposes. Because of the small size of the sample that it is feasible to study by participatory observation and the impossibility of employing a fully satisfactory sampling design, the ability to generalize the results to a wider population is severely limited.

Obviously, a survey utilizing the most exquisite sampling design is of no value if the data accumulated are inaccurate. Yet, if valid data can be obtained, a survey based on sound population sampling technique can provide a basis for generalizing about an entire community, a region, or even a country. The questionnaire approach and participatory observation should be considered complementary rather than antithetic. Participatory observation can be an extremely important tool for determining the validity of survey data. Results of surveys may at times permit cautious extension of conclusions derived from participatory observation.

It should not be imagined that participatory observation is the only method of validating the results of surveys conducted by questionnaire. Dietary intake data obtained by questionnaire can be verified by biochemical data on blood and urine. In addition, questionnaire data can be examined with respect to internal consistency. For example, within the same families, it is somewhat unlikely that intake of a specific nutrient would be over-reported for one age group and not for another.

During this workshop, Kram and Owen and Eagles and Steele have reported results obtained by a questionnaire approach; the Valentines have reported results of participatory observation; Jerome, Kiser and West have reported results obtained partly by participatory observation and partly by structured interview. Nearly all of the other participants in this workshop have presented their own impressions from personal observations, often including data from formally or informally administered questionnaires. Many of the participants in the workshop are well known to inhabitants of the communities in which they work. They are trusted and able to obtain information that might be difficult or impossible for a stranger to obtain. I cannot imagine, for example, that the Spanish-speaking residents of the Spring Garden Community of Philadelphia would withhold information from Mrs. Alvarez for fear that she would report them to "the authorities." I am therefore not greatly concerned about the validity

of data presented at this workshop; it is, however, extremely difficult to decide how far these data should be generalized to other low-income groups or to any cultural subgroup. This is the point stressed by Dr. Anderson in his opening remarks.

In planning the workshop we felt it necessary to designate several low-income groups to serve as focal points for presentation of data and discussion. There is no doubt that some of these designations were not very meaningful. Rural low-income families, for example, comprise a notably amorphous group. Only a small percentage live on farms, and many live near cities or towns. There appears to be little to distinguish rural slums from urban slums. Perhaps the most important distinction is that where population is sparse, the social and political cohesiveness that often serves as a supportive factor among the urban poor fails to develop. Our categorizations may also have led us, somewhat unfortunately, to focus on Indians, Mexican-Americans, Puerto Ricans, Cubans, etc., distracting our attention from the larger groups of low-income white persons in metropolitan centers, middle-sized cities and small towns throughout the Nation.

In the course of the various presentations and our discussions, I think we were all more impressed by the similarities than by the differences in infant feeding practices from one ethnic group to another. With respect to infant feeding, the general American culture appears to predominate over that of the cultural subgroup to which the family belongs. In total expenditures by low-income families, food is likely to receive lower priority than rent, utilities and transportation, but in the case of the young infant, food receives high priority, possibly even at the expense of diets of other members of the family. I suspect that feeding of commercially prepared strained foods—a relatively expensive way of providing the infant with his nutritional requirements—signifies love, high regard and ability to provide. That these foods are not chosen primarily for convenience is suggested by the infrequent use of commercially prepared junior foods.

We discussed a number of reasons for the remarkable infrequency of breast feeding among low-income groups. In general, breast feeding is considered "not the American way," but a wide variety of other considerations were also mentioned. Evaporated milk formulas are more commonly fed in low-income families than in families with higher incomes. A corollary to the infrequent use of commercially prepared junior foods is the relatively early introduction of table foods into the diets of many infants of low-income families.

We heard a number of times that, among various low-income groups, a fat baby is considered healthy and a thin baby is considered sickly. This concept was widely held among higher income groups 30 years ago.

I should like to conclude my remarks with several recommendations based on discussions during this workshop. First, a great deal of information about feeding practices of low-income groups could be obtained in Children and Youth projects, Maternity and Infant Care projects and well-child clinics. Such information, systematically accumulated throughout the United States, would greatly expand our knowledge of the feeding of infants, small children and individuals of other age groups.

When large surveys are conducted, a satisfactory population sampling design is essential, and the data should be evaluated critically with respect to validity.

Finally, it is clear that many low-income families are not being reached by health care services, and the urgent need to expand service programs continues. In those areas where facilities do exist, a vigorous attempt should be made with the aid of indigenous workers to identify those low-income families which have not thus far sought health care. In many instances these families need health care more desperately than those now receiving it. Causes for failure to seek help should also be determined.

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